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MALARIA.

MARTINI (E.). Malaria im Menschen, Malariaarten und Stämme. [**Human Malarial Infections.**]—Reprinted from *Zent. f. d. gesamte Hyg.* Vol. 31. No. 7/8. pp. 369–386. [4 pages of refs.]

A critical review of literature dealing with malaria which has appeared during the last ten years.

The author states that many more than 3,000 communications dealing with malaria have appeared during this period. In his review he is able to deal only with a selection of them.

It is interesting to note the important part played by malaria therapy in helping to solve many important problems in connexion with this disease. The important work of JAMES in this country is dealt with. The author discusses the question of there being a difference between the strain of malarial parasite used for malaria therapy and the parasite of the natural infections. He refers to various apparent differences in the clinical features, etc., of the two conditions. He concludes that there is no difference in the strains, and the various anomalies are due to peculiarities of the cases themselves and not of the inoculation strains.

Those interested in this subject should read the paper in original.

E. D. W. Greig.

ROSA (Alberto). L'influenza dei fattori meteorici sull'andamento della malaria. [**The Influence of Meteorological Factors on the Spread of Malaria.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 5. pp. 424–437. With 2 figs. [10 refs.] French summary.

The author's observations were carried out in the Ferrara Commune. He studied the rainfall, and temperature changes from 1900–1932, the malaria returns for the period 1922–34, and the rainfall, temperature and relative humidity from 1924 to 1934. He concludes that in undrained or improperly drained areas the rainfall is important in so far as it creates or maintains breeding sites, that is, the numbers of anopheles are the chief factor, and the temperature and relative humidity are secondary ; where drainage (bonifica idraulica) is good the temperature and relative humidity are the determining factors as favouring the duration of life of the mosquito [the article savours rather of " Science from an easy chair "]. *H. H. S.*

STRICKLAND (C.). **Hill Malaria.**—*Indian Med. Gaz.* 1935. Oct. Vol. 70. No. 10. pp. 559–560.

Some recent expeditions in the Himalayas have been disorganized by malaria, and the author suggests how this may be avoided.

The spring is the hot season in the plains, and there is no malaria apart from relapses; at this season, travellers should keep as low as possible until they can make a dash over the dangerous 1,600 foot line, and then keep up as high as possible, because there is no infection in the high hills at any season. The danger of malaria increases as one ascends the foot hills from the plains until this 1,600 foot line is reached, then it becomes gradually less until it disappears in the heights. In the autumn the plains are very malarious and owing to the increasing cold there is a gradual decline in the infection rate of mosquitoes as one ascends. At this season travellers should keep as high as possible.

W. Fletcher.

SOREL. Etude sur le paludisme dans les milieux militaires du Tonkin. [**Malaria in the Principal Garrisons of Haut-Tonking.**]—*Ann. de Méd. et de Pharm. Colon.* 1935. July–Aug.–Sept. Vol. 33. No. 3. pp. 501–525. With 11 graphs (1 plan).

This report is largely of local interest, but it shows the importance attached to prophylactic quinine in the French Army.

Malaria in Tonking, and especially in Haut-Tonking, was very severe and deadly up to the year 1910; but since that time it has undergone a gradual change and has become milder in type and more amenable to treatment. The author attributes this change partly to the effects of prolonged quinine administration and partly to a better standard of living, better food and greater comfort, which maintains the health of the soldiers and makes them more resistant to disease. Prophylactic quinine is given to all troops in malarious stations in accordance with strict orders from headquarters. In 1933, the G.O.C. issued an order to the effect that commanding officers were themselves to see that their men took quinine at the daily parade, and that if there was any doubt about the tablets being taken quinine in solution was to be issued and the dose swallowed in front of an N.C.O. The daily dose of quinine is 4 grains a day. Tables are given showing the improvement following this prophylactic treatment during a period of three years in some garrisons where no other measures of prevention were in force.

W. F.

i. LAI (Daniel G.), LI (Yu-Jen) & CHANG (Wei). **A Malaria Survey in Kao-Chiao, Shanghai.**—*Chinese Med. Jl.* 1935. May. Vol. 49. No. 5. pp. 462–468. With 1 map & 2 figs.

ii. HU (Stephen M. K.). **Notes on the Relative Adult Density of *Anopheles hyrcanus* var. *sinensis* Wiedemann during 1933 with Reference to Malaria Incidence in Kaochiao, Shanghai Area.**—*Ibid.* pp. 469–474. With 1 chart.

i. Kao-Chiao is a part of Greater Shanghai. It is surrounded, except on one side, by the Wangpoo and Yangtze Rivers and is intersected by numerous creeks. The spleen index of 752 children was 18·4 per cent. and parasites were found in 5·2 per cent. of 1,803 apparently healthy school children. Benign tertian, 59·9 per cent., was the most common type of infection: quartan came next with 33·8, and

subtertian, 6·4 per cent., was the rarest form. The peak of the malaria curve was reached in August.

ii. The only species of anopheles is *A. hyrcanus* var. *sinensis*. Data concerning the relative adult density were obtained throughout the year by means of a man-baited trap. The first massive emergence began in the latter part of May. The maximum number of anopheles was taken during the first half of July. None were caught after the middle of October. The adult density was found to be correlated with the incidence of malaria cases. *W. F.*

Hu (Stephen M. K.). **The House-frequenting Behavior of *Anopheles hyrcanus* var. *sinensis* Wiedemann in the Shanghai Area. Part I—Time of Entry.**—Reprinted from *Lingnan Sci. Jl.* 1935. July. Vol. 14. No. 3. pp. 385–394. With 4 charts & 3 figs. on 2 plates.

These mosquitoes enter houses during the night only.

Anopheles hyrcanus var. *sinensis* did not enter a man baited trap until after sunset. Once they had commenced entering they were generally found to fly in continuously during the night. Observations were made at the same time in the bedrooms of houses in the neighbourhood, and it was found that the data obtained from the trap were a good indication of what actually occurred in the village. Illustrations are given of the hut used as a trap. The collector opened all four windows of the little house and lay down under a mosquito-net in the centre. Every hour, awakened by an alarm clock, he got up, closed the windows and collected all the mosquitoes in test tubes with the help of a flash lamp. There was no light in the hut while the windows were open. The experiment lasted throughout the mosquito season, from June 22 to October 19. After the first week in October, no mosquitoes entered the trap. *W. F.*

Sinton (J. A.) & Wats (R. C.). **The Efficacy of Various Insecticidal Sprays in the Destruction of Adult Mosquitoes.**—*Records of the Malaria Survey of India.* 1935. Sept. Vol. 5. No. 3. pp. 275–306. With 2 charts & 1 fig. [23 refs.]

Insecticides which contain extracts of pyrethrum flowers are more efficient than those which do not. A mixture of one part of such an extract (Pyrocide 20) with 19 parts of kerosene oil was found by the authors to be a highly efficient spray for household use in India. Pyrocide 20 is a concentrated extract of pyrethrum flowers prepared by the McLaughlin Gormley King Co., Minneapolis, Minnesota. The spray was not toxic for man and did not damage clothing. Its cost was only half that of the best sprays on the Indian market, but its action was equally good. It should be stored in tins in a cool, dark place. Full details of the authors' experiments and tables showing the results are given. *W. F.*

Roy (Profulla Kamal). **Investigations on the Prevention of Malaria in Rural Areas.**—*Jl. Indian Med. Assoc.* 1935. Aug. Vol. 4. No. 12. pp. 531–540.

Members of Health Societies take prophylactic quinine.

The author describes the work done " at Sri-Nibetan, the Visva-Bharati Institute of Rural Reconstruction of Dr. Tagore at Surul,

Birbhum." During the dry season effort is concentrated on abolition of mosquito breeding places and all the work is done by the villagers themselves acting on co-operative principles. They form themselves into Health Societies under the guidance of the Institute. After the onset of the rains, temporary collections of water are dealt with by oiling, persons suffering from malaria are treated with quinine or, preferably, with cinchona (? cinchona febrifuge) and the healthy are given 5 grains twice a week as a prophylactic. *W. F.*

ARNAUD (J.). La prophylaxie du paludisme à In Salah (Tidikelt). Essai d'introduction des gambouses dans une oasis saharienne. [**Malaria Prevention in the Oasis of In Salah.**]—*Arch. Inst. Pasteur d'Algérie.* 1935. Sept. Vol. 13. No. 3. pp. 369–376. With 1 plan & 4 figs. on 2 plates.

This oasis measures about 4 miles long by 600 yards broad; its population, together with that of a neighbouring smaller oasis, numbers 20 Europeans and 1,000 natives. The splenic index is only 3·1; such malaria as occurs is mild in type; the only anopheline found is *A. multicolor*. Rain is rare, and when it comes it sinks quickly into the sand. The palm plantations are irrigated with water from artesian wells and underground channels. All surplus water dries up during the hot weather which lasts from May to October, but during the rest of the year pools of stagnant water in the plantation are very numerous. The author obtained a supply of *Gambusia* from the oasis of El Golea, 420 kilometres to the north, and acclimatized them gradually to the saline waters of In Salah where they are proving a success. *W. F.*

FLETCHER (Alfred H.). **A Permanent Type of Ditch Construction.**—*Amer. Jl. Public Health.* 1935. Aug. Vol. 25. No. 8. pp. 897–906. With 6 figs. & 1 chart.

Approximately $140,000 (£28,000) have been spent on malaria control in Memphis, Tennessee, during the last 14 years. The chief charge has been the oiling of the ditches. Recently 6 miles of permanent drains, lined with concrete and sods or with " rip-rap " material and sods, have been constructed with the help of relief labour. Rip-rap is broken pieces of concrete or stone with one smooth surface, such as may be obtained from old walls, paving, etc. This report gives technical details of the way in which the drains are being made, and it is illustrated with excellent " before and after " photographs.

W. F.

BIZARD (M.). Paludisme autochtone dans le région nazairienne. [**Indigenous Malaria in the St. Nazaire District (Loire inférieure).**]—*Ann. d'Hyg. Pub., Indust. et Sociale.* 1935. Sept. Vol. 13. No. 9. pp. 505–512.

Malaria was common here 45 years ago; it has now disappeared though *A. maculipennis* is plentiful.

Malaria was common in this district 45 years ago, and some of the chemists sold as much as 6 or 7 kilograms of quinine in a year. After 1895, it became less and less common until it disappeared altogether: for the last 12 years there has been no malaria in la Brière. The

district consists of an immense plain, some 8,000 hectares in extent, which is a vast lake in the winter and a grassy prairie in the summer. The villages stand like islands in this plain : each surrounded by a dyke and a circle of trees. Inside the dyke is a circle of houses and in the middle are arable fields. During the winter, they are surrounded by floods and communication with other villages is made by boat. The houses are thatched, single-roomed hovels with earthen floors. Until the end of last century the inhabitants supported themselves by turf-cutting in the summer and by fishing and catching wild duck in the winter. They were miserably poor. During the last 50 years, and especially since the war, communications have been improved, and the inhabitants have been able to work in shipyards, factories and towns, and their standard of living has been improved. This has raised their resistance to disease. Their houses have been improved and are less attractive resting places for mosquitoes. They now keep cattle, instead of sheep, and these are brought in at night and kept in sheds adjoining the houses. These changes, acting together, are probably responsible for the disappearance of malaria, for *A. maculipennis* is still present in large numbers.

Cases of malaria still occur occasionally in the towns situated on the borders of la Brière (Trignac Penhoet and St. Nazaire). Fifty cases have been diagnosed in these localities during the last 13 years. Most of them have been benign tertian infections, and they have occurred in the neighbourhood of old repatriated cases of malaria. It is possible that some cases, particularly in St. Nazaire, have been infected from cases brought on ships coming into the port. *W. F.*

Poggi (Igino). Lo stato attuale dell'endemia malarica nel comune di Vigevano. [**The Present Incidence of Malaria in Vigevano (Pavia).**] —*Arch. Ital. Sci. Med. Colon.* 1935. Sept. 1. Vol. 16. No. 9. pp. 683–694. With 1 fig. [21 refs.] English summary (5 lines).

In the Commune of Vigevano there is not much malaria ; 33 cases were reported in 1934 and in the past 15 years there has been a total of 391 only. A plan of the district is given and 29 of the total 33 occurred in one area, Morsella, while of the 391 in the 15 years 266 or 68 per cent. were in this section, and next came Sforzesca with 65 or 16·6 per cent., but in the last 8 years there has been no case in the Sforzesca section. In short, Morsella is now the only endemic focus. The prevailing mosquito is *A. maculipennis messeae* and in small numbers the *melanoon* variety. These occur over the whole territory so there is elsewhere considerable anophelism without malaria, and it is probable that adequate treatment of the infected would eradicate malaria from Morsella also, as this measure has proved so effectual in other parts of the commune. *H. H. S.*

Fadda (Siro). La malaria nelle Colonie italiane dell'Africa orientale. [**Malaria in the Italian Colonies in East Africa.**]—*Rassegna Economica d. Colonie.* 1935. Nov.–Dec. 23rd Year. No. 11–12. pp. 713–720. With 2 maps.

Maps are reproduced demonstrating by varied shading the zones of prevalence of malaria in Eritrea and Italian Somaliland and in the letterpress a few words are given regarding the local incidence. *Anopheles costalis* is the common vector, but *A. quadrimaculatus*, *A. funestus* (rare), *A. mauritianus* and *A. pharoensis* also are found, but

there is no evidence that either of the two last act as local vectors of malaria. All three forms of malaria are met with but *P. falciparum* vastly preponderates; of 1,825 blood smears examined 5 per cent. were benign tertian, 0·5 per cent. quartan, all the rest were subtertian. Pernicious forms are rare. *H. H. S.*

MONTAÑES (P.) & CARDERERA (M.). Una epidemia de paludismo a partir del virus palúdico. [**An Outbreak of Malaria spread from Inoculated Patients.**]—*Rev. San. e Hig. Pública.* 1935. Sept. Vol. 10. No. 9. pp. 213–216. With 1 fig.

In the summer of 1934 cases of malaria began to appear in Huesca, a place some distance [in the sketch included in this article there is no scale of distance] from the asylum in which malaria inoculations were being made for treatment of general paralytics. The first person attacked was a woman who had come to the asylum direct from Ansó in the Pyrenees, where malaria is unknown. She suffered from attacks of fever and *P. vivax* was found in her blood, although she was not one of the inoculated patients. This was in September 1933. During 1934 up to 14th July 45 cases had occurred and later there were others, 52 are represented on the sketch—15 in the town of Huesca, 28 in the asylum, 4 in Tierz, 2 in Quicena and 3 in isolated houses. There were two ponds near the asylum and another near Quicena in which Anopheles larvae were found. *H. H. S.*

BARBER (M. A.) & RICE (J. B.). **Malaria Studies in Greece. The Malaria Infection Rate in Nature and in the Laboratory of Certain Species of *Anopheles* of East Macedonia.**—*Ann. Trop. Med. & Parasit.* 1935. Oct. 5. Vol. 29. No. 3. pp. 329–348.

A. elutus is the most important vector in northern Greece, *A. superpictus* probably plays a secondary part, though it is more readily infected in the laboratory. Deviation by domestic animals.

Mosquitoes were collected in the country which lies between the lower part of the Nestos River and the valley of the Struma; this is probably representative of all northern Greece as far as the natural infection rate of Anopheles is concerned. The average rates of infection over 10 months were: *elutus* 2·37; *superpictus* 1·82; *maculipennis* 0·27. No variety of *maculipennis* was found except *messeae* and *typicus*. Both *elutus* and *superpictus* reach their maximum of infection in midsummer. The first sporozoite-positive specimens were found on the following dates: *elutus* May 21st, 1934; *maculipennis*, June 2nd, 1933; *superpictus*, June 29th, 1933. Precipitin tests made on mosquitoes caught in houses and in stables showed that *elutus* had a far higher percentage positive for human blood than any other species. The figures were: *elutus*, in houses 61·3, in stables 7·5; *maculipennis*, in houses 21·2, in stables 0·5; *superpictus*, in houses 29·7, in stables 1·6. The feeding habits of infected *elutus* were found to be the same as those of non-infected specimens, for the proportion of them which contained human blood was the same as the general rate for this species. Catches made during the day showed that *elutus* had the highest degree of preference for houses and *superpictus* for stables. "*Elutus* is the only species in which house-frequenting, sporozoite index, and percentage human-positive of blood meals run at all parallel."

The percentages of these anopheles which became infected when they were fed in the laboratory were very different from those found in

nature. They were as follows: *elutus* 20·3; *maculipennis* 20·2; *superpictus*, 55·2. *A. algeriensis* was also readily infected in the laboratory, but it is not a natural carrier in Macedonia. *Maculipennis* is probably of little or no importance in the actual transmission of malaria; there are large numbers of domestic animals in the villages, and deviation to animals is the probable explanation of the low sporozoite rate found in wild mosquitoes of this readily infected species. "The rôle played by *superpictus* in this part of Macedonia is difficult to determine." During recent years the numbers of *elutus* in some villages have been greatly reduced by drought, while *superpictus*, which breeds in spring-fed streams, has not been affected. The authors found that the parasite rate in the children of these villages had fallen, though *A. superpictus* was flourishing, and they also found that the sporozoite rate of *superpictus* itself was reduced as well. They consider that this species becomes of importance when a high percentage of the inhabitants has already been infected by the agency of *elutus*.

"It is quite possible that a species which, like *superpictus*, has a relatively low human precipitin rate may show many infections by virtue of the large number of gametocyte carriers provided by a more effective associated species, and without this powerful ally it might show but a small öocyst or sporozoite rate. . . . During a very long warm season here, or in a warmer region, *superpictus* might become more dangerous; and, in a region less abundantly supplied with domestic animals, both *maculipennis* and *superpictus* might be important vectors. We believe, however, that our work has established a presumption sufficiently strong to warrant the attack on *elutus* only in this region." *W. F.*

Sadojan (W. S.) & Istamanjan (L. S.). Atypische Malaria-Formen im Gebiet von Dawalu im Jahre 1931. [**Atypical Malaria in Davalu, Armenia.**]—*Arb. d. Tropeninstituts d. Volksgsndht. Kommissariat d. SSR. Armenien.* 1935. Vol. 2. [In Russian p. 342. German summary p. 370.]

The authors relate that in the latter part of 1931, September to November, certain cases of malaria occurred which presented anomalous symptoms by reason of which the diagnosis was for a time in doubt. Thirty-two such cases came under their observation; 12 of them presented neuro-psychic symptoms resembling those of tetany, meningitis and other nervous affections; 10 showed symptoms of renal involvement, 6 had signs of hepatic disease and 4 entero-colitis and dysenteric symptoms. In all malaria parasites were found in blood smears and the symptoms cleared up after treatment with quinine. Some were associated with the benign tertian parasite. The authors are of opinion that these atypical symptoms were due in part at least to an increased virulence of the plasmodium when infecting persons coming from a malaria-free district to work in Davalu.

H. H. S.

de Mello (I. Froilano) & Brás de Sá (L. J.). Ne pourra-t-on faire revivre la "Vieille Gôa"? (Une page intéressante de malariologie: le paludisme des ruines et des villes mortes.) [**Malaria of Ruined Towns. Can "Ancient Goa" be Restored?**]—*Riv. di. Malariologia.* Sez. I. 1935. Vol. 14. No. 3. pp. 273–291. With 2 plates.

Nothing remains of Old Goa but a mass of ruins overgrown with luxuriant vegetation. Its total population numbers only 75 persons,

and only half of these are in permanent residence. It is full of abandoned wells and pools ; the authors counted 296, many of which were hidden by undergrowth and ruins. It is notorious for a malignant type of malaria. The importance of Old Goa is largely sentimental ; the body of St. Francis Xavier is buried there ; it is therefore venerated by Catholics all over the world and is a place of pilgrimage not only for Christians, but for people of all casts and creeds. The wells and pits are the principal breeding places of *A. listoni* and *A. varuna*, the carriers. This survey was made at the cost of the canons of the cathedral who subscribed privately for the purpose. The author pleads that an attempt should be made to rescue the old town, "the Rome of the east," which once had a population of 300,000, and which is the only place of Christian pilgrimage in the East. *W. F.*

Ram (Raja). **Roads and Malaria in India.**—Reprinted from *Indian Engineering*. 1935. Apr. 6 pp. With 7 figs. & 1 plan.

A useful article illustrated with photographs and plans drawing attention to malaria caused by engineering work, and suggesting remedies. *W. F.*

Covell (G.) & Baily (J. D.). Malaria in Sind. Part XIII. Malaria in Hala Taluka, Hyderabad District, and in Kandiaro, Sinjhoro and Shahdadpur Talukas, Nawabshah District. Part XIV. The Seasonal Incidence of Infection with the Different Species of Malaria Parasite in Larkana.—*Records of the Malaria Survey of India.* 1935. June. Vol. 5. No. 2. pp. 109–119 ; 121–129. With 1 chart.

Wilson (T.). **Meteorological Factors as affecting the Incidence of Malaria.**—*Malayan Med. Jl.* 1935. June. Vol. 10. No. 2. pp. 39–48. With 5 charts & 1 map. [15 refs.]

The number of *A. maculatus* caught in houses does not necessarily correspond with the total number. A larger proportion enters houses when the wet-bulb temperature is high.

The author reviews the incidence of malaria over a period of five years in the Tampin and Kuala Pilah districts of Negri Sembilan which is one of the Federated Malay States. There are two rainy seasons, a lesser one in March, April, May and a greater in October, November and December. The larval incidence of *A. maculatus*, the principal carrier, is at its height shortly after the greater wet season ; the adult incidence is highest during the lesser wet season, in March, April, May ; Malaria incidence is highest in May, June, July. The author points out that the adult incidence is obtained by catching mosquitoes in houses at night, and that it represents the number seeking human blood, and not necessarily the adult output of the breeding places. *A. maculatus* appears to be more active in seeking blood during the period of higher wet bulb temperature. *W. F.*

Jackson (R. B.). **Annual Report of the Work of the Malaria Bureau for the Year 1934.**—*Hong Kong Med. & San. Rep. for Year 1934.* Appendix B. pp. 116–158. With 1 folding plate.

This record of the very large amount of work which has been done during the year deals with the results of investigations made in different

villages and camps and is chiefly of local interest. Malaria in Hong Kong is rural malaria. The following mosquitoes were found infected : *A. minimus*, *A. jeyporiensis*, *A. hyrcanus*, *A. maculatus* and *A. splendidus*. The first two are the most important carriers. The most dangerous breeding grounds are abandoned rice fields in hilly country and, in the last quarter of the year, cultivated fields during the draining off of the water just before the second harvest. A number of precipitin tests were made by M. Toumanoff of the Pasteur Institute, Saigon, on the stomachs of Anopheles caught at a labourers' camp at Shing Mun, in Hong Kong, where a dam is being built, and a large proportion of them were found to contain human blood. The percentage of admissions for malaria as compared with the admissions for all diseases to the hospitals was only 3·27 per cent. (1,392 of 42,056). (See this *Bulletin*, 1935, Vol. 32, p. 731.) *W. F.*

GERLACH (J. H. A.). Nadere beschouwingen over de malaria in de Onderafdeeling Dairilanden (Residentie Tapanoeli). [**Further Consideration of Malaria in the Subdistrict Dairilands (Tapanoeli Residency).**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Sept. 17. Vol. 75. No. 19. pp. 1639–1645.

SCHÜFFNER has given, as the causes of a low spleen rate in conjunction with a high parasite index, the following :—(1) A commencing acute epidemic. (2) Such a severe endemic of pernicious malaria that the spleen does not react on account of the prevalent cachexia. (3) Quininization especially in malaria tropica. (4) The non-inclusion of the lowest degrees of splenic enlargement, which is all important where endemicity is slight. (5) A definite form of inherited immunity (premunition), such as is found for example among the Bantus in Africa.

In the Netherlands Indies a high spleen rate in all age groups is regarded as typical of severe endemic malaria together with a much lower parasite index particularly in adults. HELFFERICH published [this *Bulletin*, 1935, Vol. 32, p. 96], as a notable exception to the findings of SCHÜFFNER and SWELLENGREBEL, his observations in the Dairilands district, where practically throughout there was found a low spleen rate with a high, often much higher parasitic index. Gerlach has continued these investigations in the same district and has obtained the same result for numbers which are considerable and which, although separately given for 3 kampongs, may be combined as follows :—(1) 416 children under 6 years, spleen rate 1·2 per cent., parasite rate 7·7 per cent. (2) 1,370 children over 6 years, spleen rate 4·5, parasite rate 5·8. (3) 527 adults, spleen rate 0·9, parasite rate 4·6 per cent. He summarizes his findings, taken in conjunction with those of his predecessor, thus :—As is commonly the case in the Netherlands Indies, the chronically endemic malaria of the Dairilands, which gives rise to a high spleen rate at all ages and to a relatively low parasitic rate diminishing gradually with advancing age, is only found when frequent infection persists. On the contrary, when the infection rate is small a low spleen rate occurs, which is at its highest in older children and then gradually diminishes, while the parasite index is relatively high and often much higher. The latter, however, just as in the case of severe endemic malaria, probably diminishes with increasing age.

The author's view is that the essential cause for this state of affairs is a differentiation in the biological type of the malaria parasite and not a development of a degree of body resistance. *W. F. Harvey.*

GARNHAM (P. C. C.). **Hyperendemic Malaria in a Native Reserve of Kenya and the Influence upon its Course of Atebrin and Plasmoquine.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. July 31. Vol. 29. No. 2. pp. 167–186. With 4 charts. [10 refs.]

Malaria in the African native living in a hyperendemic village area causes little sickness even in children, and preventive drug treatment serves no useful purpose in such a population.

This investigation was carried out in Taveta, which lies near the Tanganyika border of Kenya Colony, where the first shot in East Africa was fired during the War. The natives live in a strip of forest where malaria is hyperendemic. There were about 25 adults and 20 children in each village. One gram of atebrin (less for children) was given monthly, in 10 separate doses, to each inhabitant of one village. In a second village, 0·1 gram of plasmoquine was given in 10 doses. A third village was observed as a control. The treatment was continued for a year. The only apparent effect was a lowering of the average number of parasites found in blood films of the inhabitants of the treated villages —the parasite and spleen rates were unchanged. This did not appear to be a result of much value, because malaria causes very little illness among the natives in spite of the heavy blood infections. The average number of clinical attacks of fever during the year was one for each inhabitant. The author considers that malaria in the native of tropical Africa resembles the malaria of birds, reptiles and monkeys; immunity has become so complete that morbidity is reduced to a minimum. Eighty-five per cent. of the infants were infected by the 5th month and 100 per cent. by the 6th, but, in spite of this, they looked well-nourished and healthy. Subtertian and quartan infections are ubiquitous, but benign tertian is rare and has a focal distribution, occurring only in certain places. It is very remarkable that, in Taveta, *P. vivax* seems to be the most dangerous parasite. *P. vivax* and *P. falciparum* appear at the end of the second month of life; *P. malariae* does not appear until the fifth month, but by the end of the first year nearly every child is infected with this parasite. Immunity against *P. malariae* is soon established, and only 1·5 per cent. of quartan infections were found in 1,000 adults. Approximately half the infants over two months had crescents in their blood. About 80 per cent. of the children showed parasitic infection, 30 per cent. of the young adults and 25 per cent. of the older ones. *W. F.*

HOYT (R. N.) & WORDEN (R. D.). **Malaria Epidemic in Aurora, Ohio.** —*Public Health Rep.* 1935. July 5. Vol. 50. No. 27. pp. 895–897.

Interesting because of the quarantine imposed on the patients.

Aurora is a village about 30 miles from Cleveland, with a population of 1,000 and "two attractive inns patronized by tourists." It had had no malaria since records were first kept in 1920, until the late summer of 1934 when there was an epidemic of benign tertian with 37 cases. The breeding places were oiled and, "on advice of the State Department of Health, patients were required to stay within screened enclosures until 4 negative blood smears, taken at least 24 hours apart, were obtained. This regulation was supplemented by an agreement signed by the patient or parent to complete 8 weeks of quinine or 5 days of atabrine therapy and to submit to a final blood examination after treatment had been completed." *W. F.*

Collignon (E.). Observations générales sur la campagne antipaludique de 1934 dans le département d'Alger. [**The Antimalaria Campaign of 1934 in the Department of Algiers.**]—*Arch. Inst. Pasteur d'Algérie.* 1935. Sept. Vol. 13. No. 3. pp. 377–396. With 10 figs. on 5 plates.

The year 1934 was marked by an increase of malaria which was attributed: (1) to a lack of immunity in the population resulting from a succession of healthy years; (2) to the migration of numbers of people into newly developed areas; (3) to an unusual distribution of the rainfall; and (4) to poverty due to trade depression. This increase of malaria has not affected the whole of the country; in those places where antimalaria work has been carried out, there has been no increase except in a town near a lake which is now being drained through a tunnel into the sea. The carrier is *A. maculipennis*, var. *labranchiae*. which is found in the houses as well as in the stables. The measures adopted for the control of malaria are: (1) Permanent engineering works, such as the tunnel already mentioned; (2) Temporary work such as fortnightly oiling and minor filling and drainage; (2) The introduction of Gambusia; (4) Quininization which is carried out in all centres from the beginning of May until the end of November, and especially concerns children. The natives take quinine with enthusiasm and the chocolates containing aristoquine are liked by the children. *W. F.*

Ambialet (R.). La campagne antipaludique de 1934 dans le département de Constantine. [**Malaria in the Department of Constantine during 1934.**]—*Arch. Inst. Pasteur d'Algérie.* 1935. Sept. Vol. 13. No. 3. pp. 397–409. With 10 figs. on 5 plates & 3 plans.

The incidence of malaria was definitely above the average, though it was not as severe as it has been in some of the very bad years of the past. The year was exceptionally wet, and many marshes that are normally dry in the summer provided breeding places for mosquitoes. Some places in the plains which are free from malaria in dry years experienced severe epidemics, but the mountain villages, where streams are the only breeding places, were not troubled by outbreaks. Anopheles are most active from the middle of June to the middle of July, and again in September and November. There is little or no transmission in midsummer because the intense heat and the sirocco destroy the mosquitoes. Details of malaria and of the measures taken to deal with it in different centres are given, together with some excellent photographs showing reed-fringed lakes, marshes, and water-courses with strings of shallow pools. Good results have been obtained by antilarval measures combined with quinine prophylaxis and treatment, special attention being given to the children. *W. F.*

Gouget (R.). La campagne antipaludique de 1934 dans le département d'Oran.—*Arch. Inst. Pasteur d'Algérie.* 1935. Sept. Vol. 13. No. 3. pp. 410–417. With 12 figs. on 6 plates.

La Cava (G.). *Plasmodium immaculatum* (Grassi e Feletti, 1892) Schaudinn (1902), è l'esatta denominazione per il parassita agente della malaria terzana maligna. [**The Correct Name of the Parasite of Malignant Tertian Malaria.**]—*Policlinico.* Sez. Prat. 1935. Nov. 4. Vol. 42. No. 44. p. 2187.

According to the author of this note the usual denomination, *P. falciparum*, for the parasite of malignant tertian malaria is a synonym,

the correct name being *P. immaculatum* Grassi and Feletti 1892 and Schaudinn 1902. Other synonyms, he states, are *Haemamoeba immaculata, H. praecox, Laverania malariae* and *Haematozoon falciparum.* [This question has been discussed more than once before (see Protozoology, by C. M. WENYON, Vol. 2, p. 934. "If it be considered that Grassi and Feletti's name, *P. immaculatum* was employed for a parasite which cannot definitely be identified with that of malignant tertian malaria" the "correct name for the parasite will be *P. falciparum* (WELCH, 1897) ").] *H. H. S.*

BOURGIN (P.). Un cas de paludisme congénital. [**A Case of Congenital Malaria.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Feb.–Mar. Vol. 13. No. 2. pp. 137–138.

Parturition occurred on 14th February. Benign tertian gametocytes were found in the mother's peripheral blood and in the umbilical cord of the child. Neither mother nor child had fever. The mother was treated with quinacrine. On 20th February no parasites were found in either, but both of them had a high percentage of mononuclears.

W. F.

TANNER (N. Cecil) & HEWLETT (R. F. L.). **Congenital Malaria with Report of a Case in One of Twins.**—*Lancet.* 1935. Aug. 17. pp. 369–370. [15 refs.]

A case of congenital malaria without fever in a child born in England whose mother was infected in India.

The mother returned to England from Bengal in September 1934, and gave birth to twins in St. Pancras Hospital on January 14, 1935. She had one or two attacks of malaria every month during pregnancy, the last of them being 10 days before her confinement. One of the twins was admitted to Highgate Hospital with a history of 4 days illness, when it was 50 days old. Its blood was examined on March 8, 53 days after birth, and benign tertian parasites were found. The spleen was enlarged to 4 cm. below the costal margin. The child was given no specific treatment during the first 10 days, and, though at the end of this time it still had parasites in its blood, it had neither fever nor rigors during the whole period of observation. It was then given two five-day courses of atebrin with six days interval between them. The daily dose was 0·05 gram in divided doses. No parasites were found afterwards. There was some vomiting and slight diarrhoea during each course, but no other toxic symptoms or skin staining. No parasites were found in the other twin during repeated examinations; its spleen was not enlarged. Benign tertian parasites were found in the mother's blood. *W. F.*

SHIROKOGOROV (J.). **Symmetrical Gangrene of the Lower Extremities in Malaria, and its Pathogenesis.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. No. 3. [In Russian pp. 220–227.]

During 1932–1933 the author observed gangrene of the toes in a number of cases of M.T. malaria from the endemic regions of Azerbaijan (Caucasus). The majority of them recovered, but fifteen died and provided material for the histopathological investigation. All the cases showed signs of marked emaciation. In the majority the lesions represented dry gangrene affecting the nail phalanges of the toes.

of one or both feet, while in some cases mutilation was present. Sometimes the process assumed the character of moist gangrene, extending to the foot and leg. Microscopical examination revealed thrombosis of the venules of the affected parts and changes in the walls of the arteries. The pathogenesis of this form of gangrene is viewed by the author as follows :—The toxins bring about sclerotic changes in the walls of the small arteries and veins and cause the swelling and desquamation of the capillary endothelium. Alteration in the physico-chemical properties of the blood, due partly to the erythrocytes being loaded with parasites ; agglutination of the red cells ; the frequent formation of thrombi in the capillaries, are factors causing a retardation in the circulation of the blood ; and finally, exposure to cold—by increasing the viscosity of the blood—leads to stasis in the affected parts, with the consequences already described. *C. A. Hoare.*

Dimitriu (C. C.) & Popovici (A.). Paludisme associé à l'urticaire et au syndrome douloureux abdominal aigu. [**Malaria associated with Urticaria and Acute Abdominal Symptoms.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Bucarest.* 1935. June. Vol. 17. No. 6. pp. 99–101.

The authors were called urgently to a patient with acute abdominal symptoms and urticaria. A history of malaria contracted 9 months before, and of two subsequent relapses, put them on the right track. They examined the patient's blood, instead of sending him to the operating theatre, and they found benign tertian parasites. They attribute the abdominal pains to transient thromboses produced by parasite-laden corpuscles, malaria pigment, etc., and to the blocking of the biliary passages with thickened bile. The urticaria they consider as evidence in favour of the theory of Abrami and Senevet that the paroxysm in malaria is a manifestation of anaphylaxis. *W. F.*

Marseille (A.). Een geval van malaria quartana met verschijnselen van appendicitis. [**Quartan Malaria simulating Appendicitis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Aug. 20. Vol. 75. No. 17. pp. 1505–1506.

The patient, an adult, complained of pain about the umbilical region and of constipation ; there was no vomiting. Forty-eight hours later after the bowels had acted, pain was felt in the right side of the abdomen and particularly so on palpation over McBurney's point. There was no enlargement of liver or spleen ; pulse 70 good, temperature 37·6°C. in the evening. Blood smear showed schizonts of *P. malariae* and the large monocuclear count was 8 per cent. of a total of 5,200 leucocytes. Quinine was given, and the symptoms cleared up.

The author has found 10 similar cases recorded ; 5 were diagnosed only after operation had been undertaken. Of these ten, 8 were infected with *P. vivax*, 2 with *P. falciparum*. Attention is called to the slight leucopenia and relative monocytosis in these cases.

H. H. S.

Chatterjee (Nirmal Chandra). A Case of Capillary Bronchitis and Cerebral Malaria.—*Calcutta Med. Jl.* 1935. Oct. Vol. 30. No. 4. pp. 231–233.

Young (A. Greville). Cerebral Malaria or Encephalitis Lethargica ? [Correspondence.]—*Brit. Med. Jl.* 1935. Sept. 14. p. 523.

Jorge (A. Lourenço), da Silva (José Ferreira) & Leal (A. Estillac). Esplenomegalias congestivas hemorrhagiparas. [**Congestive Splenomegaly with Haemorrhage.**]—*Bol. da Secretaria Geral de Saúde e Assistencia.* Rio de Janeiro. 1935. Oct. 15. Vol. 1. No. 2. pp. 13–30. With 3 plates. [24 refs.]

The authors describe three cases of splenomegaly, the spleen extending to below the level of the umbilicus. Two had had acute dysentery and syphilis and all gave a history of malaria. In one a diagnosis of Banti's disease was made. Administration of adrenalin brought about considerable reduction, but some time later, a week in one case, there were attacks of haematemesis and the splenic enlargement was still further reduced, nearly to normal. The condition is explained as being a splenic thrombophlebitis and the haemorrhage as due to rupture of the gastro-splenic anastomoses. The precise parts played by the malaria, the dysentery and the syphilitic infection are not determined. *H. H. S.*

Mosna (Ezio) & Salustri (Enrico). Grado di resistenza alla chinina di differenti ceppi di *Plasmodium vivax*. [**Resistance of Different Strains of *P. vivax* to Quinine.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 3. pp. 263–272. With 12 charts. [12 refs.] English summary (7 lines).

The authors tested three strains of *P. vivax*, one from Northern, one from Central and one from Southern Italy, each on 4 general paralytics. The points particularly investigated were the period of incubation, the type of fever, the capability of infections in Anopheles, and the resistance of the disease set up to quinine.

As regards the incubation, in two cases the northern strain had the long periods of 22 and 19 days, the other two with this strain were 9 and 10 days and, speaking generally, there was (with the two exceptions) little or no difference, the periods being 10–13 days. In each case 12 Anopheles were used to infect. Regarding the second point, no differences were noted, either among the two infected by Anopheles or others infected by blood inoculation—11 with the northern strain, 20 with the central and 10 with the southern. A protocol shows the numbers of mosquitoes (varying from 670 to 110) applied to those infected with the different strains, the numbers examined and the numbers and percentages found infected. No great differences were detected between the strains ; with the northern the percentages were 71·5 and 93 ; with the central 70 to 88·7 ; with the southern 98·5. Lastly, 0·3 gm. of quinine in one dose sufficed to check the attacks of fever due to the first two strains and to cause temporary disappearance of parasites from the blood, but this dose had no effect on the fever produced by the southern strain. *H. H. S.*

Trensz (F.). De l'influence des ions salins sur la floculation et la surfloculation du sérum des paludéens. [**Henry's Reaction. The Influence of Saline upon Flocculation and Surflocculation.**]—*C. R. Soc. Biol.* 1935. Vol. 119. No. 24. pp. 966–968.

Chorine and others consider that flocculation and surflocculation are identical, but the author believes that he has shewn that they differ fundamentally. He now brings forward additional evidence in support of his views. He has carried out the reaction in solutions of neutral

salts of Na, K, Mg, Ca and NH4. As the strength of some of these solutions was increased, both flocculation and surflocculation diminished; it was not merely a question of molecular concentration, but differed with the different salts. Moreover, the curves of flocculation and surflocculation did not run parallel with the increase of salt concentration. For example, with ammonia, they deviated progressively at first and then approached one another. The maximum deviation occurred at a concentration of 3 per 1,000. Some salts accentuated flocculation while they diminished surflocculation. For example with PO_4 (NH_4) H_2, in concentrations of 10 to 15 per 1,000, flocculation was strongly increased while surflocculation was suppressed. The results of these experiments tended to show the essential difference between the two phenomena. This could also be demonstrated by gradually increasing the quantity of distilled water used in the test while keeping the amounts of the other components fixed. With progressive dilution, melanoflocculation decreased while surflocculation increased. *W. F.*

Costadoni (Antonio). Ricerche sulla reazione di Henry per la malaria. [**Henry's Reaction in Malaria.**]—*Riforma Med.* 1935. Sept. 28. Vol. 51. No. 39. pp. 1467–1470, 1473–1475. [95 refs.]

The latter part of this article, that in which the author gives an account of his own investigations, is of great interest. The first part treats of the devising of the reaction, of theoretical considerations as to its *rationale*, and of the findings and records of others.

Dr. Costadoni examined 184 sera. Fifty-four were from patients with malarial history, 32 actually suffering from malaria at the time of examination (31 with benign, 1 with subtertian infections), 22 had suffered in the past. Thirty sera were from subjects apparently in sound health and 100 were from patients suffering from diseases other than malaria.

In all those (32) with malaria the reaction, both melano- and ferro-flocculation, was positive. Of the others (22) eight had had attacks recently and the spleens were still enlarged although no parasites were seen in their blood; 7 of these were positive, the other doubtful. Another 14 had suffered from malaria some time before, as far back as the War. Of these two were definitely positive, one doubtful, and one reacted to one form only, the melano-flocculation: the rest were negative. These the author interprets as confirmation of cure. Two others had been under malaria treatment for syphilis. They were tested prior to inoculation, twice during the period of incubation, and during the early attacks, but invariably with negative results; they became positive after 4 and 6 febrile attacks respectively.

Among the 100 suffering from non-malarious conditions there were cases of syphilis in different stages, of malignant tumours (mostly carcinoma), of hepatic cirrhosis (multilobular), pernicious anaemia, leucaemia, etc. Unfortunately there was no opportunity of testing cases of trypanosomiasis, leishmaniasis, typhus or undulant fever (in which non-specific positive reactions have been recorded). Five among the hundred reacted positively, two with secondary syphilitic papular eruption, two others with chronic haemolytic jaundice and one with Weil's disease. In another patient, with Laennec's cirrhosis of liver, the melano-reaction was positive, but not the ferro-reaction.

H. H. S.

Brandt (Robert) & Horn (Ludwig). Erfahrungen mit der Malariareaktion von Henry bei Impfmalaria. [**Henry's Reaction in Inoculation Malaria.**]—*Klin. Woch.* 1935. Oct. 26. Vol. 14. No. 43. pp. 1538–1540.

The authors consider that Henry's reaction gives very useful indications in inoculated malaria.

The work was done at Vienna at the instance of Wagner-Jauregg, the introducer of the malaria treatment of general paralysis, and was interrupted by the death of the second author. The authors used albuminate of iron and found that the dilutions advised by Henry were too great, a difference possibly due to the fact that inoculated and not natural malaria was in question. Details of their technique are furnished. The experiments concerned 50 malaria-treated patients and included 126 tests: the controls numbered 206. The results showed that all cases were positive during the malaria cure. The first change was noted at the 3rd–4th attack and the height was reached with the 5th–7th; all were strongly positive at the close. All again became negative with recovery from the malaria [whether natural or drug-caused is not quite clear]: the time taken for the change was 14 days to 8 weeks. Two cases were positive before the malaria inoculation. Of the controls half were Wassermann + and half Wassermann —. Among the latter the percentage of non-specific positives lay between 3 and 6. With the Wassermann positives on the other hand the Henry positives exceeded 11 per cent. The authors discuss their experiments from the standpoints of diagnosis and biology with special reference to the cure of general paralysis. *A. G. Bagshawe.*

Cassuto (Nathan). Sulla patogenesi delle recidive a lunghi intervalli nella malaria. Ricerche sperimentali sulla scimmia. [**The Pathogenesis of Malarial Relapses at Long Intervals.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 5. pp. 384–390. With 2 figs. on 1 plate. [12 refs.] English summary (9 lines).

Relapses may be regarded as of two types, one of which is of the nature of a recrudescence where a certain number of the malaria parasites survive treatment and continue to proliferate until they are sufficiently numerous to give rise to symptoms. The other type is demonstrated by the author's observations here detailed. He received a *M. rhesus* which had been inoculated in England with *P. knowlesi* in August 1934. Repeated search for parasites in the blood was negative, so a fresh inoculation of 2 cc. blood rich in parasites was made on January 7th, but still none were seen, and a third inoculation of 4 cc. on 19th January was equally barren of proof. The animal was splenectomized in March and survived the operation well but 10 days later the peripheral blood showed an enormous invasion with plasmodia and the monkey died. This is interpreted by saying that the animal was in a condition of "immunity equilibrium," and when extirpation of the spleen removed this defence the animal succumbed to a heavy infection. The spleen had showed malarial pigment, but less than that of another Macacus similarly infected and dead of it. A third monkey, like the first, did not show parasites in its peripheral blood although it had been inoculated 2 months before and examinations were made repeatedly, nevertheless its blood when inoculated into two other, healthy, monkeys gave rise to infection. It is held that in the cases of

the first and third the parasites are few and do not increase, owing to the immunological equilibrium until this is upset by operation, or, in nature, by some intercurrent illness or depressant. *H. H. S.*

Voljenski (L.). **Laboratory Experiments on the Application of Schist Products for the Destruction of Mosquito Larvae.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. No. 4. [In Russian pp. 316–320.]

The author describes the result of the application of various products of decomposition of schists, especially of the fraction of tar obtained after the separation of benzene, with a boiling point between 250° and 350°C., as larvicides. The extract was mixed with an equal amount of petroleum and applied to the surface of aquaria containing culicine larvae and pupae, the dosage being 30 cc. per cub. m. The destruction of the developmental stages of the mosquitoes proved to be considerably more rapid than in the control experiments using petroleum alone. Moreover, the pungent odour of the schist products protected the aquaria from being repopulated by mosquitoes for at least one month after treatment. *C. A. Hoare.*

Mochkovski (Ch.). La chimioprophylaxie du paludisme. [**Prophylactic Chemotherapy of Malaria.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. No. 3. [In Russian pp. 161–186. French summary pp. 186–187.]

This is mainly a review of our present knowledge regarding the use of chemotherapeutic agencies in the prophylaxis of malaria.

C. A. Hoare.

Pinto (Genserico de Souza). A prophylaxia chimica da malaria.—*Folha Med.* 1934. Nov. 25. Vol. 15. No. 33. pp. 385–389. [35 refs.]

Repetto (R.). Un essai de prophylaxie individuelle de la malaria au moyen de l'association plasmochine-atébrine.—*Ann. Soc. Belge de Méd. Trop.* 1935. Dec. 31. Vol. 15. No. 4. pp. 537–539.

Barbosa (Amando). Experiencias de lucha antipalúdica por los medicamentos, sin aplicación de ninguna medida antianofélica. [**Fighting Malaria by Drugs in the Absence of Anti-Mosquito Measures.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 4. pp. 352–368. With 7 graphs. [13 refs.]

In La Bazagona, Spain, malaria has been treated by drugs for the five year period 1930–34 and the results are recorded in this paper. Graphs give the prevalence of the forms—benign or malignant tertian —in different subdivisions of the district, but these need not be detailed. The general conclusions were that intensive treatment of patients suffering from benign tertian infection did not lessen the incidence by this type in the period under consideration. During that period all with subtertian infection were given combined quinine and plasmoquine, and the numbers attacked increased steadily year by year—such an increase was not seen when quinine alone was used. There is, consequently, no advantage in giving the combined drugs. The rise in number of cases in 1934 cannot, it is said, be attributed to the

fact that the duration of treatment was reduced, nor does immigration account for the endemic increase, but this question is not discussed in detail. *H. H. S.*

Franchi (F.) & Sautet (J.). Quininisation préventive et paludisme au cours de manoeuvres en pays palustre. [**Preventive Quinine during Military Manoeuvres in a Malarious Country.**]—*Bull. Soc. Path. Exot.* 1935. June 12. Vol. 28. No. 6. pp. 456–460.

The authors had experience of preventive quinine during manoeuvres in a malarious district in the south of Corsica, during 1934. They draw particular attention to the wastefulness of this method. If a French soldier contracts malaria he becomes automatically entitled to a pension, even though preventive quinine may have made the clinical symptoms negligible. Large doses must be given if they are to prevent symptoms ; the dose given to French troops in Macedonia during the war was about 10 grains a day. The advantage of preventive quinine is that a soldier can be kept fit for duty over a special period. When the quinine is stopped the patient experiences a sudden attack of malaria without any stage of invasion ; the authors call it " decapitated malaria." *W. F.*

Hill (Rolla B.) & Olavarria (José). **The Treatment of Malaria with Small Amounts of Quinine.**—*Jl. Amer. Med. Assoc.* 1935. June 29. Vol. 104. No. 26. pp. 2329–2332. [14 refs.]

A three-year trial with a short treatment of 1 gram (15·5 grains) of quinine sulphate daily for 4 days was made at the malaria dispensary of Campo Lugar, a town of 1,200 inhabitants in Spain. The authors concluded that this short treatment was sufficient for fresh benign tertian infections, but that subtertian infections " should be treated for a longer period, while some other drug might be tried for the spring relapses." *W. F.*

Adalja (K. V.) ; Gupta (Prafulla Kumar Sen). Intramuscular *versus* Intravenous Quinine. [Correspondence.]—*Indian Med. Gaz.* 1935. Sept. Vol. 70. No. 9. pp. 538–539.

Vigoni (M.). Ueber Erfahrungen mit Chinin-Weil bei Malaria. [**On Quinine-Weil in the Treatment of Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Oct. Vol. 39. No. 10. pp. 416–422.

Report on the results of treatment with quinine-Weil of cases of malaria in the Belgian Congo.

At the request of the firm producing quinine-Weil the author carried out a series of therapeutic tests with it amongst his patients in the Belgian Congo. The formula of quinine-Weil is $C_{20}H_{24}O_2N_2C_{16}H_{11}O_2N$. It is free from the bitter taste of quinine. In his observations he used a solution of 20 : 1,000. His patients were mainly infants and native children of the Congo. He grades the dose according to weight rather than age. From 3 to 15 kilograms the doses of quinine-Weil varied from 10 to 50 centigrams per day. The infection was chiefly due to *Plasmodium falciparum* ; *Plasmodium malariae* was met with occasionally, chiefly in combination with *P. falciparum* ; *Plasmodium vivax* was never found.

As a result of his investigations the author concludes that quinine-Weil (60 per cent. quinine base) appears to be very similar to quinine bihydrochloride in its action on the malarial infection. As in the case of quinine the gametocytes of *Plasmodium falciparum* are much more resistant to it than the schizonts, so that it is frequently necessary to use plasmoquine along with it. The advantages of the drug over quinine, particularly in the case of children, are absence of bitter taste and milder toxic actions, such as giddiness and ringing in the ears. *E. D. W. Greig.*

Massias (Charles), Bourgin (P.) & Nguyen-van-Tan. Traitement du paludisme par un dérivé acridinique (quinacrine) et un dérivé quinoléinique (rhodoquine). Nouvelles observations. [**The Treatment of Malaria by an Acridine Derivative (Quinacrine) and a Quinoline Derivative (Rhodoquine).**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Feb.–Mar. Vol. 13. No. 2. pp. 79–82.

The treatment given by the authors consists of 5 days' quinacrine treatment, followed by 5 days' treatment with rhodoquine (a drug resembling plasmoquine) and quiniostovarsol. The rhodoquine and the quiniostovarsol are made up together into tablets, which are known as " Stovoquine." A saline purgative is given on the first day. The dose of quinacrine is 0·30 gram daily for adults, 0·20 for children between 5 and 10 years ; 0·10 for younger children. The daily dose of rhodoquine is 0·005 gram for every 10 kilograms of body weight. The results of this treatment have been excellent, and the authors have observed no toxic symptoms. *W. F.*

Martial (J. E.). La quinacrine dans la tierce maligne. [**Quinacrine in Malignant Tertian.**]—*Ann. de Méd. et de Pharm. Colon.* 1935. Apr.–May–June. Vol. 33. No. 2. pp. 301–325.

The author gives the details of 24 cases of malaria treated with quinacrine (the French atebrin) in French Indo-China. The dose was 0·1 gram, three times a day ; the treatment was continued for 5 days in some cases, and for 10 days in others. There were no toxic symptoms and the results were excellent. The author draws attention to the national importance of this drug, the discovery of which has made France independent of foreign supplies of quinine and other anti-malarial drugs. He states that it causes the subtertian gametocytes to disappear from the blood. [This is probably a mistake due to the small number of cases observed. Atebrin has no direct action on crescents.] *W. F.*

Robin (L.) & Truong-van-Huan. Essais comparés de prophylaxie médicamenteuse antipalustre en région hyperendémique par la praequine, associée à la quinine ou à la quinacrine. [**A Comparison of Quinine-Praequine and Quinacrine-Praequine as Prophylactics.**]—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 650–658.

Quinacrine proved more satisfactory than quinine, but drugs cannot take the place of antilarval measures.

These experiments were carried out on an isolated rubber estate in the red-earth region of Indo-China. The strictest medical supervision ensured that the drugs were actually swallowed ; the coolies

were not allowed to associate with people outside; no new labour was engaged during the period of the observation. Half the coolies were treated with quinine and the gametocidal drug praequine (which resembles plasmoquine); the other half were treated with praequine and quinacrine (which is identical with atebrin). The treatment was continued for 5 months and then stopped. No antilarval measures were taken; the coolies used no mosquito nets; the carriers were *A. minimus* and *A. funestus*. The drugs had a beneficial effect in both groups, but the spleen-rate, the parasite-rate and the gametocyte-rate were much lower in the quinacrine group, and the coolies preferred quinacrine to quinine. The cost of treatment was approximately the same. No sooner were the drugs stopped than malaria began to increase, and within a couple of months it was rather worse than at the beginning of the experiment. The authors consider that if drug prophylaxis is to be efficient it must be carried on permanently and that there would always be danger of poisoning if the administration of synthetic drugs were not in the hands of medical men. They conclude that antilarval measures are the best form of prophylaxis and that the association of drug prophylaxis with these gives quicker results. *W. F.*

DE MORAES (Carlos Vieira). A chimica synthetica a serviço da therapeutica da malaria. (A cura do impaludismo pela atebrina e atebrina-plasmochina.) [**Atebrin with and without Plasmoquine in Malaria.**]—*Ann. Paulist. Med. e Cirurg.* 1935. Oct. Vol. 30. No. 4. pp. 355–377. With 8 charts.

Eight cases are detailed, seven with *P. vivax* infection, one with *P. falciparum*. The point chiefly worth noting is that the author found the chloride of atebrin given intramuscularly for 10 days in doses of 0·125 gm. more successful as a gametocide than atebrin, possibly because when injected it was able to act more readily than the tabloids of the combined drugs. *H. H. S.*

FERNANDEZ (Alberto J.). Notas practicas sobre el tratamiento del paludismo. Comunicación hecha en las reuniones de la Policlinica Caracas. [**The Treatment of Malaria.**]—*Rev. Policlinica Caracas.* 1935. Aug. Vol. 5. No. 23. pp. 1553–1558.

This was a paper communicated to a meeting of the Caracas Polyclinic and relates some personal experiences with plasmoquine and atebrin in the treatment of malaria in Venezuela. Most of the cases were of patients suffering from severe first infections of *P. falciparum*. The author's experience coincides with that of others who have reported on these drugs. *H. H. S.*

COMPAGNINI (G.). La chinoplasmina nella terapia della malaria.—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 5. pp. 404–423. French summary (7 lines).

DAWSON (W. T.), GINGRICH (Wendell) & HOLLAR (E. D.). **Intravenous Toxicity of Atabrine (Atebrin).**—*Amer. Jl. Trop. Med.* 1935. Sept. Vol. 15. No. 5. pp. 515–520. [14 refs.]

Intravenous injections of atebrin should be given only in emergency. The injection should be given slowly, and the dose should not exceed 0·1 gram. The toxicity of atebrin intravenously is 20 to 40 times

greater than that of atebrin by the mouth. [See BRIERCLIFFE, Ceylon Epidemic, *ante*, p. 218.]

The authors inoculated atebrin into rabbits by the ear vein. They found that, provided the injection was made very slowly, 0·003 gram per kilogram was fairly safe. This corresponds roughly to 0·2 for an adult man. The injection of 0·005 gram per kilogram, if completed within one minute, caused a mortality of 20 per cent. It is not always safe to calculate directly from the figures obtained from animal experiments the doses which should be given to human beings. For example, rabbits may survive a dose of morphine amounting to 300 milligrams per kilogram of body weight given intravenously, but in man, 1 milligram is dangerous. Many references to papers on the toxicity of atebrin are given. A patient of Eckhardt's tolerated a dose of 0·3 gram, but on the following day, 0·4 gram was followed 2 hours later by violent vomiting, collapse, weak pulse and stupor; he was revived by hot coffee, and there were no sequelae. The dangerous doses in milligrams per kilogram in laboratory animals are as follows:—*Rabbits*; by mouth, 400; subcutaneous 75; intravenous 7. *Cats*; mouth 200; subcutaneous 100; intravenous 10. *White mice*; mouth 1,000, subcutaneous 500; intravenous 50. The authors consider that in view of its slow excretion there should be an interval of 8 weeks between courses of atebrin, and that it should be taken only under medical supervision. *W. F.*

DE MURO (Paolo). L'atebrin nella cura dell'infezione malarica. [**Atebrin in Malaria.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 4. pp. 325–343. [87 refs.] French summary.

The action of atebrin in 25 cases of malaria is discussed. Five patients were suffering with first attacks of benign tertian fever, another five with relapsed benign tertian, four from primary subtertian, five with relapsing subtertian, three with quartan and three with mixed benign and subtertian fever. The dosage employed by the author is: For children under one year ½ tablet or 0·05 gm. daily, for those between 1 and 3 years ¾ tablet or 0·075 gm., 3–6 years 0·1 gm., 6–10 years 0·2, 10–12 years 0·25 and for adults 3 tablets or 0·3 gm., in each case given for 8 days. The usually recommended 5-day course he finds insufficient for the Agro Romano strain of parasite. He gives the drug in a single dose and never on an empty stomach. In the cases of benign tertian and quartan infections the fever is cut short in 2–3 days; in the subtertian not for 4–6 days. Few showed any intolerance; four exhibited a yellowish discoloration, one, suffering with relapsed benign tertian, complained of abdominal pain, and one, with primary subtertian, slight headache which lasted for 3 days. *H. H. S.*

CHOPRA (R. N.) & ROY (A. C.). **On the Estimation of Minute Quantities of Atebrin in the Blood.**—*Indian Med. Gaz.* 1935. Sept. Vol. 70. No. 9. pp. 504–505.

The atebrin is extracted from the blood by means of ether. This is evaporated, and the residue is dissolved in decinormal hydrochloric acid. Caustic soda and amyl alcohol are then added. The amyl alcohol forms a supernatant layer which takes up all the yellow colour of the solution. This is compared with atebrin solutions of known strength. *W. F.*

VARDY (E. C.). **Notes on a Clinical Investigation of the Treatment of Malaria by Atebrin Musonat Injections.**—*Malayan Med. Jl.* 1935. Sept. Vol. 10. No. 3. pp. 67–77. With 5 charts.

Atebrin musonate was given to 50 serious cases. In 32 the patients were cured within 48 hours. In two the drug had no effect, and quinine was given. In two the drug may have had a toxic action.

Fifty patients at the Tan Tock Seng Hospital in Singapore were treated by injections of atebrin musonate. The manufacturers state that the two sizes of ampoules supplied by them contain a quantity of a very soluble atebrin salt corresponding to 0·1 gram and 0·3 gram, respectively, of atebrin hydrochloride. The acid constituent of this salt is without any toxic or therapeutic action. The daily dose for adults and for children over 8 years is 0·3 gram atebrin ; for children up to 4 years, 0·1 gram ; for children between 5 and 8 years, 0·2 gram. The daily dosage may be injected all at once. The total dosage recommended is 0·6 gram in 48 hours, then no more. For intravenous administration it is advisable not to exceed the single dose of 0·1 gram in adults. The injection should be made slowly, and two to three doses may be given in 24 hours. " In parenteral use," state the makers, " atebrin is best injected intramuscularly." Only two of the author's patients were given intravenous injections. Thirty-five were suffering from subtertian, 10 from benign tertian and 5 from mixed tertian. They were all selected for this treatment because they were seriously ill. Nevertheless, in 21 cases, a " temperature-pulse-rate response " occurred ; that is to say, the temperature and pulse began to fall directly after the first injection and within 4 to 12 hours had reached a normal level ; in a short time the patients were sitting up and asking for food. In 11 cases the temperature did not come down immediately after the first injection, but it did so after the second and remained normal until discharge. These two types of response the author calls Type I and Type II. In Type II, the pulse takes 48 to 72 hours to reach the normal rate. There were 10 patients who gave what the author calls a Type III response. Here the temperature took 3 or 4 days to come down, but when it was once down to normal it remained there. Finally, in 2 cases there was no response at all, and, after 0·9 gram had been given, they were treated with quinine. As regards the effect on the parasites : *P. vivax* disappeared in 2 or 3 days and *P. falciparum* in 4 or 5. In a healthy volunteer, the ordinary doses caused no destruction of erythrocytes, but, in the malaria patients, its administration was followed by a fall of 5 to 15 per cent. of haemoglobin, probably due to the destruction of infected corpuscles. One patient had a fit which may have been due to the drug. Another, with cardiac lesions, died 12 hours after his first injection. Atebrin was found in the urine within 2 hours of its intramuscular injection and the author therefore considers it unnecessary to give it intravenously. (See BLAZE and SIMEONS, this *Bulletin*, 1935, Vol. 32, p. 746; HICKS, *ante*, p. 235, and also BRIERCLIFFE, *ante*, p. 218.) *W. F.*

VAN SLYPE (W.). Du traitement du paludisme chronique de l'enfant noir par un nouveau sel d'atébrine. [**Atebrin Musonate.**]—*Bull. Soc. Path. Exot.* 1935. Oct. 9. Vol. 28. No. 8. pp. 701–705.

The author compares the action of atebrin musonate with that of atebrin dihydrochloride, or "atebrin for injection." He found that atebrin musonate had a much slower action, but he recommends it

for chronic cases. The powder keeps well in the tropics and the injections cause neither pain nor local reaction. [See report on Ceylon Epidemic, *ante*, p. 218.] *W. F.*

Fernando (P. B.) & Wijerama (E. M.). **Death after Injection of Atebrin Mussonate.**—*Lancet.* 1935. Nov. 9. p. 1056.

A man aged 20 was treated for malaria by two intramuscular injections of atebrin musonate which were given at Kurnegalle Hospital. He had no more fever until two months later when he was admitted to the General Hospital, Colombo, with a history of three days' fever, rigors and vomiting. His temperature was 99°F., his pulse 130, his skin was yellow and he was very ill. His urine contained no bile, albumen, or atebrin. No parasites were found in his blood. The direct and indirect van den Bergh tests were positive. He died two days later. All the tissues were stained yellow; atebrin was found in fluid from the pericardial and pleural sacs. No malaria parasites were found in the organs or tissues, but malaria pigment was present in the liver and spleen. The liver was moderately enlarged and congested. There were no macroscopic changes in the kidneys, but the microscope showed proliferation of the cells of Bowman's capsule. [The authors do not state how they satisfied themselves that the patient had received no atebrin prior to admission except the intramuscular injections two months before.] *W. F.*

Chopra (R. N.), Sen (B.) & Ganguli (S. K.). **Tebetren in Indian Strains of Malaria.**—*Indian Med. Gaz.* 1935. July. Vol. 70. No. 7. pp. 362–366.

Its action resembles that of quinine, but it costs much more.

Tebetren "is a combination of acridine and quinine derivatives with a derivative of cholic acid." The authors treated 22 patients with 3 tablets 3 times a day for 5 days, and then kept them under observation for a fortnight. They found that "Tebetren resembles quinine and atebrin in its action on Indian strains of malaria . . . As compared with cinchona alkaloids the drug is much more expensive and appears to have no particular advantage over them." *W. F.*

Uspenskaya (M.). **Treatment of Quartan Malaria with Plasmocide.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. No. 3. [In Russian pp. 234–235.]

The author reports successful treatment of 32 cases of quartan malaria in the Caucasus with plasmocide. The course of treatment is divided into at least 4 cycles, in each of which the drug is given in doses of 0·03 gm. 3–4 times a day 3 days in succession, followed by an interval of 4 days without treatment. *C. A. Hoare.*

Schulemann (Werner). Die Wirkung der synthetisch dargestellten gegen Malaria wirksamen Arzneistoffe.—*Riv. di Malariologia.* Sez. II. 1935. Vol. 14. Supp. to No. 3. pp. 33–52. With 2 plates. [80 refs.]

Karapetjan (E. G.). Vergleichende Beurteilung der Behandlungsmethoden der Malaria.—*Arb. d. Tropeninstituts d. Volksgsndht. Kommissariat d. SSR. Armenien.* 1935. Vol. 2. [In Russian pp. 339–341. German summary pp. 367–369.]

Riolo (Pietro). La terapia adrenalinica venosa delle splenomegalie malariche. [**The Treatment of Malarial Splenomegaly by Adrenalin Intravenously.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 3. pp. 248–262. [11 refs.]

The author's routine for treating malaria patients with splenomegaly by means of intravenous injections of adrenalin was to start with 0·01 mgm. in 1 cc. distilled water and increase by 0·01 mgm. to 0·1 or even 0·2 mgm. if well tolerated. On reaching the maximum dose, this was repeated for some 20 days till the splenic enlargement disappeared or was no longer undergoing reduction. It was noted that the blood picture also improved and might even become normal.

The author treated 18 patients whose histories are given in this article. The degrees of enlargement were: I. Spleen palpable. II. Extending to "the lower half of the space between the costal arch and the umbilicus." III. Extending below the umbilicus. IV. To the iliac fossa.

Among the 18 there were: One in stage I, 7 in stage II, 9 in stage III and 1 in stage IV. In the one in stage I the spleen could no longer be felt at all; of the 7 in stage II, in 4 it could no longer be felt, in 2 it was just palpable, in one there was "marked reduction" [not defined]. Of the 9 in stage III, it was not felt at all in 3, just palpable in 4, and reduced to stage I in the other two. Lastly, in the case of the one with the great enlargement, stage IV, after treatment the spleen was only just palpable. Nothing is said of any other treatment, such as quinine, being given at the same time; the results seem to be due to the adrenalin only. *H. H. S.*

Cicchitto (Angelo M.). Contributo al trattamento delle splenomegalie malariche ai tropici. La soluzione citratata di Normet, sola o associata all'adrenalina endovenosa, nelle splenomegalie malariche croniche. [**Treatment of Malarial Splenomegaly.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 5. pp. 391–403. French summary.

The author refers to previous records in which reduction of an enlarged spleen due to chronic malaria was obtained by injections of Normet's citrate solution (sodium citrate 52 gm., magnesium citrate 10 gm., iron potassium tartrate 3 gm., manganese citrate 0·005 gm., aq. dest. one litre) and the modified formula (sodium citrate 22 gm., calcium citrate 6·5 gm., citrate of magnesium 4·5 gm., Ferri et ammon. cit. 1 gm., manganese citrate 0·005 gm., water a litre). He then mentions 20 patients in whom better results were obtained by combining the second formula of Normet with adrenaline intravenously, injections being given daily with increasing doses of adrenaline solution, starting with 1/100 mgm., then 1/90, 1/80, to 1/20 or even 1/10 mgm.

Of 60 Somalis 20 were given Normet No. 1, 20 Normet No. 2, and 20 Normet 2 + adrenaline. Among the first 9 showed marked and 5 slight improvement; of the second in 7 the spleen was reduced to normal limits, 9 showed a spleen reduced to 1–2 fingers' breadths below the costal margin and 4 were slightly reduced; with the combined citrates and adrenaline 13 had a spleen reduced to normal, 5 to 1–2 fingers' breadths below the ribs and only 2 showed but a slight reduction. Nine who had had "slight reduction" were some

months later given the mixed treatment ; in 4 the reduction was to normal, in 2 the spleen was still palpable below the ribs, in the other three there was no change. *H. H. S.*

Stark (Wilhelm). Ueber Splenektomie bei Malariasplenomegalien. [**Splenectomy for Malarial Splenomegaly.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Sept. Vol. 39. No. 9. pp. 374–381.

An account of splenectomy in 32 cases of malarial splenomegaly. The majority were between the ages of 20 and 40 years ; the youngest patients (2) were 12 years, and the oldest (2) 45 years. In addition to splenomegaly the following features were noted in the cases :— hepatomegaly (18), ascites (2), jaundice (2), marked cachexia and anaemia (3), cardiac changes, disturbances of the sexual functions, *viz.*, infantilism (2) and one obstinate case of eczema. The author describes the technique of the operation. He lost 6 cases, giving an operation mortality of 18·7 per cent. The clinical results of the operation were considered satisfactory. Red cells with Jolly bodies were noted in the course of his study of the blood changes following the operation. From his investigations he considers that in splenectomized patients the functions of the spleen are assumed gradually by other organs, such as the bone marrow and reticulo-endothelial system. *E. D. W. Greig.*

Schwetz (J.). Recherches morphologiques sur un *Haemoproteus* spécial et deux *Plasmodiums* du hibou *Syrnium nuchale* et sur deux *Plasmodiums* du petit tisserin *Brachycope anomala* (Fam. *Ploccidae*). [**Researches on Avian Malaria.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 3. pp. 214–247. With 1 text fig. & 2 coloured plates. [14 refs.]

In 1930 the author described as *Plasmodium fallax* a new malarial parasite which he had found in the Belgian Congo in the owl *Syrnium nuchale*. It occurred in association with a *Haemoproteus* and resembled *P. circumflexum* subsequently described by Kikuth (1931) in its schizonts which occupied the length of the red blood corpuscle on one side of the nucleus. As the infection was a mixed one with a *Haemoproteus* it was difficult to determine the character of the gametocytes. The author has had an opportunity of studying 14 owls which were examined over varying periods. He has discovered that this owl is liable to infection with two species of malarial parasite one of which is *P. praecox* (*relictum*) and the other *P. fallax*, which, moreover, is unlike *P. circumflexum* in that it has elongate instead of rounded gametocytes. The *Haemoproteus* is identified as *H. syrnii* Mayer. The weaver bird (*Brachycope anomala*) was found to harbour two parasites, *P. praecox* and *P. elongatum*. The various parasites described are illustrated in two coloured plates. *C. M. Wenyon.*

Huff (Clay G.). *Plasmodium hexamerium*, **n. sp. from the Bluebird, inoculable to Canaries.**—*Amer. Jl. Hyg.* 1935. Sept. Vol. 22. No. 2. pp. 274–277. With 16 figs. on 1 plate.

The new species of bird malarial parasite here described has as its main characters schizonts not larger than the nuclei of the red cells and producing very regularly six merozoites and elongate gametocytes.

P. vaughani and *P. tenue* are very similar but produce from 4 to 8 merozoites while *P. rouxi* invariably gives rise to 4 merozoites. It is possible that *P. tenue* is identical with *P. vaughani*, in which case it will be a synonym. The 4 parasites are closely related. The new species, illustrated in a plate, was studied in the canary in which it was isolated from a blue bird (*Sialia sialis sialis*). The parasite was also found in the Maryland yellowthroat, the catbird (*Galeoscoptes carolinensis*) and the mourning dove. *C. M. W.*

Buxton (P. A.). **The Effect of *Proteosoma* upon the Survival of *Culex*.**—*Parasitology*. 1935. Oct. Vol. 27. No. 4. pp. 547–550.

The paper describes a number of experiments in each of which one group of *Culex fatigans* was fed on a bird, the blood of which contained gametocytes of *Proteosoma*, the other on an uninfected bird. In each case the mosquitoes fed on the infected bird showed a tendency to die earlier than the controls. It is pointed out that this observation has no immediate relation to problems of human malaria, but it should be easy to test whether an infection with the species of *Plasmodium* which occur in man, shortens the life of *Anopheles*. It appears to be possible that some species of *Anopheles* do not carry malaria in nature because they readily become infected, with results fatal to themselves. *P. A. Buxton.*

Mochkovski (Ch.). Au sujet des méthodes de la chimiothérapie expérimentale du paludisme. [**Experimental Chemotherapy in Malaria.**]—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 639–650.

Investigations have been carried on in Moscow during the last 5 or 6 years in connexion with the synthesis of antimalaria drugs and their evaluation. Birds infected with *P. relictum* and with *Haemoproteus* have been employed for testing the action of the drugs on the schizonts and the gametocytes respectively. This paper describes the manner in which the value of a drug is calculated from: DT *dosis tolerata* = the maximum tolerated single dose: DTR *dosis tolerata repetita* = the maximum dose which can be repeated daily without danger; DP *dosis parasitocida* = the smallest single dose which causes the parasites to disappear; DPR *dosis parasitocida repetita*; DA *dosis affectans* = the dose which slows down the multiplication of the parasites; DR *dosis retardans* = the dose which delays the appearance of parasites in the peripheral blood; DRR *dosis retardans repetita*; DD *dosis disflagellans* = the dose which prevents exflagellation of gametes. *W. F.*

Hamid (E. A.). Old and New Remedies in the Treatment of Malaria.—*Bombay Med. Jl.* 1935. Aug. & Sept. Vol. 4. Nos. 8 & 9. pp. 134–138 & 145–150. [20 refs.]

Swezey (W. W.). **Intravenous Administration of Certain Drugs in the Therapy of Avian Malaria.**—*Amer. Jl. Trop. Med.* 1935. Sept. Vol. 15. No. 5. pp. 529–544. With 6 figs.

This concerns mercurochrome and 3 other drugs.

There have been many conflicting reports about the efficacy of mercurochrome in malaria; Avison and Koo, of Severence Union

Medical College in Korea, have reported that all their cases were cured by intravenous injections of the drug. The author treated canaries infected with *P. cathemerium* and came to the conclusion that it was " not of sufficient value to warrant its use. This is also probably true of human malaria, but it may be of some value as an adjunct to other drugs or in cases where there is an idiosyncrasy to other malariacides." Carbarsone and vioform were also tested and found useless. *W. F.*

i. van Rooyen (C. E.) & Pile (G. R.). **Observations on Infection by *Plasmodium knowlesi* (Ape Malaria) in the Treatment of General Paralysis of the Insane.**—*Brit. Med. Jl.* 1935. Oct. 12. pp. 662–666. With 2 charts.

ii. British Medical Journal. 1935. Oct. 12. pp. 672–673.— **Monkey Malaria in G.P.I.**

i. Most patients were readily infected. The disease was quickly arrested by quinine, but, contrary to experience elsewhere, atebrin had no effect on it. The symptoms were milder than those of benign tertian.

Twelve patients were inoculated intramuscularly or intravenously with 3 to 5 cc. of blood containing *P. knowlesi*. The intravenous route is to be preferred. Some patients were inoculated with blood from other human cases, but, in most of them, the blood was obtained from a monkey by cardiac puncture. Infected, defibrinated blood, kept at 0°C. in the refrigerator, was still infective for a monkey after 16 days. The incubation period usually lasted for about a week. The fever was quotidian. It should be checked after the 8th rigor by a dose of quinine ; " as little as 7½ grains of the drug given intramuscularly is sufficient to deal with a massive infection . . . Although the drug atebrin acted specifically in the monkey, its administration failed to diminish the pyrexia or inhibit the multiplication of parasites in cases of human infection." The susceptibility of the patients varied ; the majority were readily infected, a few were more resistant, particularly two who had been previously infected with *P. vivax*. *M. rhesus* was reinfected with *P. knowlesi* after passage through two human patients.

ii. The strain of *P. knowlesi* employed by Drs. van Rooyen and Pile was brought to England two years ago, in an infected monkey, by Major G. Covell, I.M.S., and has been maintained at the London School of Hygiene and Tropical Medicine by passage through monkeys ; it is still as virulent as when it was first introduced. Passage in man causes attenuation both for man and monkey. Infected blood has been sent through the post from London to various other centres in Europe and America ; the maximum period successfully withstood was 12 days. Patients infected with *P. knowlesi* at Horton Mental Asylum by Colonel S. P. James and Dr. W. D. Nicol have not exhibited any such resistance to atebrin as is recorded by Drs. van Rooyen and Pile. *W. F.*

Nicol (W. D.). **Monkey Malaria in G.P.I.** [Correspondence.]—*Brit. Med. Jl.* 1935. Oct. 19. p. 760.

P. knowlesi is not as useful as *P. vivax* or *P. malariae*, for the treatment of general paralysis.

Only about 45 per cent. of people who have never had malaria, and a still smaller proportion of those who have had it, are susceptible to infection with *P. knowlesi* transmitted by blood inoculation; moreover, in 25 per cent. of those infected, the attack is abortive and therapeutically useless. Passage from man to man lowers the virulence of the parasites, and, as it cannot be cultivated in mosquitoes, it would be necessary to go to the inconvenience of keeping monkeys if *P. knowlesi* were brought into general use. The employment of *P. vivax* can be regarded as both safe and efficient. *W. F.*

SOUTHERN MEDICAL JOURNAL. 1935. Aug. Vol. 28. No. 8. pp. 736–764.—**Symposium on Malaria.**

HANSON (Henry). **The Need for Continued Malaria Research** (pp. 736–738).

CRAIG (Charles F.). **Report of the Subcommittee on Malaria Research of the National Malaria Committee** (p. 739).

MELENEY (Henry E.). **Recent Research upon the Malaria Plasmodia** (pp. 739–742 [21 refs.]).

GINGRICH (Wendell). **Recent Research upon the Diagnosis of Malaria** (pp. 742–746 [37 refs.]).

CLARK (Herbert C.). **Recent Research on Therapeutics of Malaria** (pp. 746–749 [31 refs.]).

MAYNE (Bruce). **Recent Research on Malaria Therapy of Venereal Diseases. Review of Progress in the New Researches of Malaria Therapy of Venereal Disease** (pp. 750–753 [57 refs.]).

RILEY (George E.), FAUST (Ernest Carroll) & COOK (S. S.). **Some Recent Advances in the Epidemiology of Malaria** (pp. 753–757 [36 refs.]).

FAUST (Ernest Carroll) & DIBOLL (Celeste Goff). **Malaria Mortality in the Southern United States for the Year 1933** (pp. 757–763. With 2 figs.).

BOYD (Mark F.). **A Review of Malaria Control Activities in the Southern States during 1934** (pp. 763–764).

Misgivings concerning malaria control.

This symposium should be of great value to those interested in malaria because it contains reports from the subcommittee on the subject of malaria research during 1934 with references to a large number of papers published during that year. Particularly interesting are the paragraphs dealing with the treatment of early syphilis by therapeutic malaria, and the treatment of general paralysis by means of the radiotherm which, according to HINSIE and BLALOCK, gives better results than malaria.

Dr. Henry Hanson, State Health Officer of Florida, took the chair at the annual meeting of the National Malaria Committee, at St. Antonio, Texas, in November 1934. His opening address was definitely pessimistic. He said that the eradication of malaria was not appreciably nearer than it was when the Committee was formed in 1916; the best that could be hoped for was to accomplish a fair degree of control. He calculated that some 50,000 cases occurred annually in Florida. "What to do about it is the question asked by those responsible for furnishing funds for control. We ask, do we know what to do about it? Rashly, some would answer yes! . . . There are extensive areas where it is out of the question to use the Canal Zone methods as practised prior to 1919 . . . In Florida it is impracticable

to attempt a general drainage program . . . In Florida are large areas, some swamp, where no attempt should be made to control Anopheles by drainage, oiling or dusting . . . Individual protection must be resorted to, which almost without exception will be in the form of screening, that is, mosquito-proofing the house, and proper treatment of cases . . . The important thing is to choose effective preventive measures compatible with the economic status of the community concerned."

Dr. Mark Boyd reviewed the malaria situation in the south-eastern States. The drainage programmes of Georgia and Mississippi were given a tremendous impetus by the relief funds for providing work for the unemployed. "Owing to the hurried manner in which many of these projects were prepared and executed, time will be required to determine their actual effect on malaria incidence. All State activities are now confronted with the question of providing for the maintenance of this drainage, a problem of no mean magnitude . . . All in all, the present status of the malaria situation is disquieting. The rising incidence of the past few years indicates that the fairly steady decline experienced in the decade previous to 1931 can only to a limited extent be attributed to deliberate control work."

In an editorial on malaria incidence in the Southern States during 1934–5 it is stated that there were over 5 million cases during the year. Twelve hundred miles of drains were dug by labour working under the relief schemes, but it is feared that if these drains are not maintained they may become breeding places for *A. quadrimaculatus* and cause malaria instead of preventing it. *W. F.*

SERGENT (Edmond). La prémunition dans le paludisme. [**Premunition in Malaria.**]—*Riv. di Malariologia.* Sez. II. 1935. Vol. 14. Supp. to No. 3. pp. 5–25. With 4 figs.

Only when one has malaria is one immune to malaria.

The author discusses and contrasts three kinds of immunity. (1) Innate resistance. He proposes this term for a natural congenital immunity which exists apart from infection; such, for example, as the immunity of man to the parasites of bird malaria; (2) True immunity. He designates by this term, the post-infectious immunity conferred by certain infectious diseases, such as typhoid fever and scarlet fever after they have been cured and after the host has been sterilized. (3) Premunition. This term was proposed, in 1924, by the author, PARROT and DONATIEN to indicate an immunity which depends upon the continued presence of the infective agent in the body, and which ceases when that infection disappears. In syphilis, for example, an infected man is immune to superinfection, but directly he is cured his immunity disappears. In tuberculosis, too, the Calmette-Guérin living vaccine produces a mild latent infection, which, while it lasts, immunizes, but with the disappearance of the infection the immunity disappears too; the inoculation of dead vaccines produces no immunity in such diseases. In many protozoal diseases, such as piroplasmosis and trypanosomiasis, immunity is of the same kind; it is a "premunition" due to the persistence of infection. The author then proceeds to discuss the question of immunity in malaria. He does not agree that the immunity of black races is due to an innate, congenital resistance, but considers that it is acquired by means of infections contracted in infancy. This immunity is not a "true

immunity," but is due to the persistence of malaria parasites; it is a "premunition." Premunition is concurrent with infection; it begins and ends with the infection. A single inoculation suffices to produce lasting premunition in bird malaria, but in man it must be sustained by repeated reinfections. *W. F.*

SINTON (J. A.) & HARBHAGWAN. **Studies in Immunity in Malaria. Part IV. The Results of Multiple Heterologous Superinfections, with a Discussion of their Relationship to Some Epidemiological Problems and to the General Principles of Treatment.**—*Records of the Malaria Survey of India.* 1935. Sept. Vol. 5. No. 3. pp. 307–334. [17 refs.]

Two or three infections with different strains produced protection against clinical manifestations of infection with most, but not all, other strains. The results of the experiments are considered in relation to human malaria. In ordinary tropical practice, it is unsafe to delay or modify treatment in an attempt to encourage the development of immunity. Prophylactic quinine is discussed.

The authors used monkeys which had already been inoculated with several strains of monkey malaria by MULLIGAN and Sinton (this *Bulletin*, 1934, Vol. 31, p. 462), and they repeated the inoculations until each animal had been inoculated with 6 strains. The inoculations were separated by an interval of 2 or 3 months. Six monkeys were employed, and in 5 of them no *clinical* relapse followed the second, or any later, inoculation with a heterologous strain. Usually, the heterologous strain produced a parasitic relapse without symptoms. The result of the inoculation of the 6th heterologous strain was to cause a transient increase of parasites in 4 cases; in one, it had no effect. The sixth monkey died from malaria after the inoculation of the 5th heterologous strain. The results "*suggest* that when an animal has acquired a tolerance to two or more of our different strains of *P. knowlesi*, a high degree of *protection* is produced *against the acute clinical manifestations* of superinfection. This protection . . . does *not*, however, appear to give an *immunity against superinfection* with all other strains of parasite in every case." It appears that each strain possesses several different immunological elements, some of which are common to other strains, and this explanation was put forward by MULLIGAN and Sinton (*ibid*). The authors suggest, however, that each of their so-called "strains" may really be a mixture of several pure strains, arising from a multiple infection with the same species in the original monkey host. They point out that all their animals came from the same area and that, consequently, the infections might merely represent mixtures of strains occurring in the natural environments of these monkeys. They consider that no general conclusions can be drawn to the effect that infections with 2 or 3 strains are sufficient to give a high degree of tolerance towards later infections with other strains of the same species.

They then discuss the results of their monkey experiments in relation to the treatment of human malaria, and the question of either allowing malarial infections to run on to spontaneous cure, or of giving only a minimal amount of treatment, with the view of allowing the development of tolerance. They are of opinion that "while such a procedure may be possible, safe, and advisable under special conditions, such as those in mental, and other well-equipped and well-staffed hospitals,

it does not seem suitable for routine use under the ordinary conditions of tropical practice." Where people live in areas of low endemicity and where reinfection with the same strain of parasite is unlikely to occur, they recommend that treatment should be directed towards the production of a radical cure. In regions of high endemicity, on the contrary, treatment should be limited to clinical cure in order to cut short the attack and obviate the risk of a fatal result. It is pointless to aim at a radical cure when reinfection is constantly occurring, and it appears that, in order to maintain tolerance, it is necessary for the individual to continue to harbour parasites. Where people are exposed to frequent infection over comparatively short periods, for example troops sent into malarious areas, clinical prophylaxis is recommended. Six grains of quinine daily may be sufficient for soldiers, but, for large undisciplined bodies of men, one must rely on larger doses given at longer intervals. Prophylactic treatment usually keeps the parasites below fever level, but they are numerous enough to stimulate the development of tolerance and, when the drug is stopped, the attacks which develop in those not radically cured will be usually less severe than those seen in primary infections. *W. F.*

DE SANCTIS MONALDI (Tullio). Ricerche sulla malaria sperimentale da inoculazione di sporozoiti. [**Malaria experimentally set up by Inoculation of Sporozoites.**]—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 4. pp. 344–351. French summary.

For these experiments sporozoites from the glands of Anopheles were inoculated into human subjects, some intradermally, some subcutaneously and some intravenously. Those of *P. vivax* were used. Subcutaneous injections in quantities from 2,500 to 100,000 were barren of result. Intradermal inoculation of 5,000 was followed 74 days later by an attack, but others injected with 50,000 and 90,000 exhibited no signs of infection. Intravenous inoculations of the same doses in 3 out of 7 cases were followed in 15 or 17 days by typical attacks. *H. H. S.*

SAUTET (Jacques). Influence du froid sur les oeufs d'*Anopheles maculipennis*. [**The Influence of Cold upon the Eggs of** *A. maculipennis*.]—*C. R. Soc. Biol.* 1935. Vol. 120. No. 32. pp. 412–413.

The author kept mosquito eggs at a temperature of 4°C. and controls of the same batch at ordinary temperatures. In the cold season, eggs laid by reactivated hibernating females hatched in 6 to 7 days at laboratory temperature, but if they were kept at 4°C. they did not hatch, even if they were taken out of the ice chest after 6 or 7 days at 4°C. and were then kept at ordinary temperature. In the hot season, eggs kept at 4°C. hatched in 15 to 25 days. The vitality of the eggs of active females is much greater than the vitality of the eggs laid by hibernating females. *W. F.*

POKROWSKI (S. W.). Essai d'obtenir les pontes hibernales d'*Anopheles maculipennis* en conditions de laboratoire. [**Obtaining Eggs of** *Anopheles maculipennis* **under Laboratory Conditions in Winter.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1935. Vol. 14. No. 3. [In Russian pp. 299–301. French summary p. 301.]

A. maculipennis var. *typicus* and *messeae* are the most frequently encountered mosquitoes in hibernation in central URSS. If provided

with a blood meal they can easily be made to deposit eggs at the laboratory temperature of 19°C. It is not necessary to raise the temperature of the surroundings, for example, to 26°C., in fact these temperatures seem to affect both the viability of the anopheles and the rate of maturation of the ova. The number laid under laboratory conditions is greater for *A. maculipennis messeae* (average 150) than for *typicus* (average 112), while in summer their infective averages are 263 and 293, reversing the order under laboratory conditions.

H. H. S.

ROZEBOOM (L. E.). **Infection of *Anopheles bachmanni*, Petrocchi, with *Plasmodium vivax*, Grassi and Feletti, and Observations on the Bionomics of the Mosquito.**—*Amer. Jl. Trop. Med.* 1935. Sept. Vol. 15. No. 5. pp. 521–528.

A. bachmanni is one of the white hind-footed anophelines that have been found in Panama in recent years. A favourite breeding place of these mosquitoes is within the crown of water lettuce, *Pistia stratiotes*. They bite viciously in the jungle in the daytime. The author infected them experimentally, but not so readily as *A. albimanus*, which were fed at the same time. The specimens which became infected were less heavily infected than *A. albimanus* which were fed on the same human case. *W. F.*

DE BUEN (Sadi). Contribución de los servicios anti-paludicos españoles al conocimiento de la biologia de los anofeles.—*Medicina Países Cálidos*. Madrid. 1935. Dec. Vol. 8. No. 12. pp. 574–593. [46 refs.]

SWELLENGREBEL (N. H.). Le médecin et l'entomologie. [**The Doctor and Entomology.**]—*Riv. di Malariologia*. Sez. II. 1935. Vol. 14. Supp. to No. 3. pp. 73–86.

This is a delightful lecture. The author showed by numerous examples that a knowledge of entomology was essential to the study of malaria, but at the same time he warned his listeners that they should not become the slaves of systematic entomology.

An early example of the value of entomology to medicine was the establishment of the mosquito theory. An early objection to the theory was that the distribution of mosquitoes did not coincide with incidence of malaria, and that the theory failed on these grounds. Then GRASSI pointed out that not all mosquitoes but only anopheles carried malaria. Later on, the distribution of malaria and anopheles was studied by STEPHENS and CHRISTOPHERS in India. They found no malaria in some places where anopheles were most abundant, and much malaria in some places where there were very few. Again the mosquito theory was shaken, but these workers found that there were many kinds of anopheles, only some of which were carriers of malaria. The mosquitoes which swarmed in the places where there was no malaria were *A. rossi* which did not carry the disease, those in the malarious places were *A. listoni* which did carry it. It is a costly business to attempt to get rid of all the mosquitoes in a malarious place. All that is necessary is to find out which species is the carrier, and for this a knowledge of the entomology of the adults is necessary ; then, control measures can be limited to dealing with the breeding

places of this particular species; for this a knowledge of the larvae is required. As an example of this "species sanitation," the lecturer mentioned a valley in the interior of Sumatra where malaria was endemic and mosquitoes were breeding everywhere. It was impracticable to deal with all the breeding places, but it was found that the only carrier was *A. ludlowi*, the larvae of which were limited to certain ricefields used as fish ponds. When these ponds were done away with, malaria disappeared; it was unnecessary to deal with the other anopheles. The north coast of Java is highly malarious. Two closely related anopheles are found there: *A. ludlowi* and *A. rossi*. *A. ludlowi* is responsible for the malaria, but *A. rossi* is not a carrier. Species sanitation is possible here, because *A. ludlowi* breeds in salt water only, while *A. rossi* breeds everywhere. The systematic entomologists recognize *A. ludlowi* and *A. rossi* as different species though the morphological distinctions are small; but they recognize no difference between the *A. ludlowi* of Java, which breeds only in salt water, and those of Sumatra which breed in fresh water, yet it is just this biological peculiarity which has made it possible to deal with malaria on the coast of Java. Thus a sanitarian may court disaster if he relies on systematic entomology alone, for a given species does not always behave in the same way in one country as it does in another. A striking example of this occurred on the East coast of Sumatra: towards the end of the War, the tobacco planters had great difficulty in feeding their coolies, and they decided to plant rice for their benefit. The rice fields in the plains of Java and Borneo breed swarms of anopheles, but there is no malaria because these anopheles are *A. hyrcanus* which does not act as a carrier there. In the deltas of the Yang-Tse and the Ebro, in Macassar and in the Celebes, this same mosquito is plentiful but harmless. Consequently the planters of Sumatra had no fear that the new rice fields on the East Coast plains, where *A. hyrcanus* breeds, would prove unhealthy. Unfortunately malaria soon appeared in epidemic form, and WALCH showed that the carrier was *A. hyrcanus* which he found infected in high proportion. It is also the principal vector in other parts of Sumatra. It is therefore different from the harmless *A. hyrcanus* of Java and other parts of the world, though from the entomological point of view it is the same. Professor Swellengrebel next spoke of the *A. gambiae* of South Africa which breeds in small pools of water, free from weeds and exposed to the sun, while the same species throughout the rest of Africa prefers the stagnant water of marshes. In conclusion, he touched upon the question of the fresh water (non-carrying) and the salt-water (carrying) races of *A. maculipennis* which are found in Holland. [See SWELLENGREBEL, *ante*, p. 221.]

W. F.

BAKER (F. C.). **The Effect of Photoperiodism on Resting, Treehole, Mosquito Larvae. (Preliminary Report.)**—Reprinted from *Canadian Entomologist*. 1935. July. pp. 149–153.

The cessation of growth in the larvae of certain of tree-hole mosquitoes of North America during the winter is due in some way to the shorter period of daylight.

Eggs of *Aëdes triseriatus* Say, laid in the late summer, would not hatch when placed in water in November, though all contained fully developed larvae. Half the batch of dried eggs were then illuminated

artificially for six hours each evening for five weeks. On immersion in water great numbers then hatched, but very few of the unilluminated controls. Equally striking results were obtained with wintering larvae of *Culicoides guttipennis* Coq. and *Anopheles barberi* Coq. Those which were exposed in artificial tree-holes to a " 16-hour day " began to grow and soon pupated. Larvae at the same temperature receiving only the normal amount of daylight showed no signs of growth.

From his experiments, which were very carefully controlled, the author concludes that the length of day is the dominant factor in initiating the rest period in the autumn and bringing about renewed growth in the spring in these larvae. *V. B. Wigglesworth.*

MAGOON (E. H.). **A Portable Stable Trap for capturing Mosquitos.**—*Bull. Entom. Res.* 1935. Sept. Vol. 26. Pt. 3. pp. 363–372. With 6 figs. (4 on 1 plate).

" The stable trap, as introduced into Jamaica for capturing adult mosquitoes, is a small screened building with openings which trap the mosquitoes that enter in search of the domestic animal confined inside." The animal used is a donkey, mule, calf or horse. This portable stable is made of galvanized iron sheeting and wire gauze panels, on a wooden framework. The roof and sides are separate members, which can be bolted together for use by means of wing-nuts. Scale drawings, plans and specifications are given. *W. F.*

GANGULI (A. C.). **Observations on Malaria-carrying Mosquitoes of Calcutta.**—*Records of the Malaria Survey of India.* 1935. Sept. Vol. 5. No. 3. pp. 213–222. With 2 maps & 2 charts. [11 refs.]

An example of man-made malaria in a town.

The following are the only species transmitting malaria in Calcutta : *A. stephensi*, *A. sundaicus*, and *A. varuna* ; *A. stephensi* is the most prevalent. There is an enormous number of galvanized iron cisterns in Calcutta, most of which contain unfiltered water for flushing privies. Others contain filtered water which the inhabitants have pumped up from the ground floor, because the supply of filtered water is intermittent and at low pressure. Larvae were found in about a quarter of 12,000 cisterns examined. In some houses water is stored in masonry cisterns on the ground floor and *A. stephensi* larvae were found in 16 per cent. of these. *A. stephensi* is rarely found in the most backward areas of the city, which are without a water supply ; it is most common in that part which is provided with a water-carriage system of sewage disposal and a supply of unfiltered water for flushing. In those areas which are supplied with filtered water only, and are without a water-carriage system, it is much less prevalent. *A. sundaicus* was found only in the eastern border of the city, near Salt Lakes. In almost all cases it was breeding in water which was only slightly saline. Most of the tanks in which it was found contained floating algae. It was most prevalent immediately after the rainy season. *A. varuna* was found in the south of the city, breeding in large tanks with marginal vegetation. No larvae could be found in tanks which were kept clean. *W. F.*

Puri (I. M.). **Synoptic Tables for the Identification of the Full-grown Larvae of the Indian Anopheline Mosquitoes.**—*Health Bull. No. 16. Malaria Bureau No. 7.* 69 pp. With 81 figs. Second Edition. 1935. Delhi: Manager of Publications. [As.4 or 5*d*.]

In this edition the author has profited by experience of the errors of students during four years' use of the Synoptic Tables, at the Annual Malaria Class held at Karnal by the Malaria Survey of India, and a number of alterations have been made. The subject-matter of the pamphlet, which is wider than the title would imply, is dealt with under the following headings:—Structure of the Larva; Collecting and Rearing; Mode of Examination of the Larvae; Fixing, Preserving and Mounting; Identification of Larvae; Simple Synoptic Table; Advanced Synoptic Table; Important Recent Synonyms of Indian Anophelines; List of Indian Species, with Breeding Places and Distribution. In the first of the two tables, wherein brevity as well as simplicity has been studied, varieties are not included. With regard to the identification of larvae, while attention is drawn to the occasional usefulness of a knowledge of the breeding habits and distribution of the various species, the author rightly points out that "variations in the breeding habits are very common indeed. . . ."

It is only necessary to add that throughout Health Bulletin No. 16 the explanatory figures are clearly drawn, and that the work as a whole should prove useful to many in India besides those for whom it is primarily intended. *E. E. Austen.*

Weyer (Fr.). Die Variabilität der Grosse bei den Rassen von *Anopheles maculipennis* unter natürlichen Bedingungen und im Experiment. [**Variability in Size in the Races of** *Anopheles maculipennis*, **under Natural Conditions and in Experiments.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Oct. Vol. 39. No. 10. pp. 399–408. [14 refs.]

Among the earliest morphological characters used to distinguish races of *A. maculipennis* was, in conjunction with the maxillary index, the mean size of the females. The most convenient way of measuring size is to take the length of the wing, and the author has already shown that the mean of this is not constant, but is subject to marked variation during the same year and from one year to another. This applies especially to the race *atroparvus*, which in North Germany was found to be slightly smaller than the race *messeae*, the difference, however, being by no means so pronounced as stated by Dutch authors. Although generally of theoretical rather than of practical importance, differences in size may nevertheless have a certain value when eggs are not available for comparison. Yet Martini and others have shown that external factors such as climate, larval food, colour of the bottom of the breeding-place, etc., are not without influence on the size of the adults, which also varies inversely with the temperature of the water wherein the larval stage was passed.

On measuring adults of *atroparvus* and *messeae* from two localities in North Germany where both races occur, considerable differences (*e.g.* 4·93 as compared with 5·29 mm.) in the mean length of the wings were found. But when in winter *atroparvus* females from two centres in East Friesland, where this race alone occurs, were examined, some of the mean wing-lengths were actually in excess of those previously registered for *messeae*. As regards the influence of climate in a more

extensive area, a comparison of Danish and North German specimens of *atroparvus* and *messeae* with representatives of the same races from Rumania and Italy showed that as the temperature rises the mean size diminishes, and *vice versa*. Experimental results (which, as pointed out by the author, are, for various reasons, less easily obtained than might be supposed) confirm, in the case of both races, the view that the mean size of the adult insects is subject to modification by external influences. Larvae hatched from the same batch of eggs produced larger imagines if allowed to develop at a lower temperature than that to which the water containing the remainder was exposed ; and batches of under-nourished larvae developed into imagines materially smaller than those bred from well-fed larvae. While differences in mean size occurring in nature in representatives of the same race are thus explained, the reason why, in Germany at any rate, *messeae* has hitherto proved so remarkably constant in size is yet to seek. *E. E. A.*

Roubaud (E.), Colas-Belcour (J.) & Treillard (M.). Influence de la concentration en sel marin sur le développement larvaire d'*Anopheles maculipennis* (var. *atroparvus*, *fallax* et *labranchiae*). [**The Influence of the Concentration of Sea-Salt upon the Development of the Larvae of** *A. maculipennis* (**var.** *atroparvus*, *fallax* **and** *labranchiae*).]—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 568–571.

Diluted salt water is more favourable than fresh water to the development of all 3 varieties.

These experiments were made by putting larvae, two days old, into varying dilutions of sea-water, and observing if they thrived and how long they took to pupate. The varieties of *A. maculipennis* employed were *atroparvus* from the Vendée on the west Coast of France, *fallax* (*maculipennis*) from Normandy, and *labranchiae* from Italy. The larvae of *atroparvus* soon perished in concentrations varying between 9 parts of sea-water to 1 of distilled water, down to 3 parts of sea-water to 7 of distilled water. The optimum concentration was about 1 to 5, which was equal to a concentration of 6·54 grams of NaCl per litre. At higher dilutions, and in pure water, there was a heavy mortality. Even the sweet water variety, *fallax*, did not flourish in pure water. Here, the optimum concentration was 4·31 gram of NaCl per litre. With *labranchiae*, it lay between 3·45 and 0·86 gram per litre. In conclusion, it appears that a concentration of sea-water ranging between 1/5 to 1/20 is more favourable than pure water to all varieties of *A. maculipennis* ; it may be because of its influence either on the flora of the water or on the surface tension and osmotic pressure. *W. F.*

Kraan (H.), de Buck (A.) & Swellengrebel (N. H.). **On the Fat- and Watercontent of Hibernating** *Anopheles maculipennis* **var.** *atroparvus* **and var.** *messeae* **in Holland.**—*Riv. di Malariologia.* Sez. I. 1935. Vol. 14. No. 3. pp. 201–213.

In Holland during September and October adults of both var. *messeae* and var. *atroparvus* have what is known as " fat " in their adipose bodies, and in the case of *messeae* the bulkiness thus produced is so marked as to render this variety distinguishable at sight. " In some years at least ' fat ' individuals may be found in equal number

among *messeae* and *atroparvus*, but in October 'fat' *messeae* contain more fat and water than 'fat' *atroparvus*." During winter, adults of both varieties suffer emaciation; but whereas in *messeae* this takes place slowly, and is really a matter of "'dehydration' because the loss of fat is slight compared with the loss of water it involves," individuals of *atroparvus*, which feed at intervals during hibernation, grow lean quickly as the result of losing equal proportions of fat and water. With the termination of hibernation in the latter half of February, females of *atroparvus*, "except for a certain disturbance in the water-fat balance," are much as they were in the previous autumn, and are quickly recovering from the deterioration in physical condition caused by their partial winter fast. On the other hand, "Unlike *atroparvus*, 'lean' *messeae* have not yet commenced to repair the losses sustained during the complete inanition lasting over the whole of the 6 months of hibernation. As a consequence they have now really turned lean, the loss of fat being greatly in excess of the loss of water." *E. E. A.*

Missiroli (A.). Nuova varietà di *Anopheles maculipennis*. [**New Variety of** *A. maculipennis*.]—*Ann. d'Igiene.* 1935. May. Vol. 45. No. 5. p. 333.

Professor Missiroli has recently been studying the Anophelines met with on the margins of Pergusa Lake, which is 670 metres above sea-level in the Province of Enna, Central Sicily. Of 165 oviposits from *A. maculipennis* captured near the lake 162 were of *A. maculipennis labranchiae* and 3 of a variety not previously described and which he has named *A. maculipennis pergusiae*. The eggs are broader than those of *labranchiae* and somewhat shorter, of a uniform grey colour, with a marked frill and striated air cells like those of *labranchiae* but so small as to be seen only with difficulty, and they bear considerable resemblance to those of *A. mac. elutus*. "Examination of the male hypopygium and the morphological and biological characters of adults which we shall obtain by breeding will enable us to determine the characteristics of the new variety with greater precision." The present communication is merely a preliminary note. *H. H. S.*

Walch (E. W.) & Walch-Sorgdrager (G. B.). De eieren van eenige Anophelinen in Ned.-Indië. [**The Eggs of Certain Species of Anopheles in Netherlands Indies.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Oct. 1. Vol. 75. No. 20. pp. 1700–1730. With 76 figs. on 6 plates (4 folding). [21 refs.] English summary.

The authors' summary is as follows:—

"1. This article contains a description of the eggs of 15 species of Anopheles, of which those of *A. albotaeniatus, umbrosus, punctulatus* and *leucosphyrus* were till now not yet known. Those new species we obtained from Borneo and New Guinea in paper with formaline. The eggs of *A. hyrcanus* var. *sin.* from Nanking (also preserved in paper with formaline) were described.

"2. There were observed some differences in the situation, number and form of the bosses of some species; especially those of the subgenus Neomyzomyia were clearly distinct from other kinds and those of *A. maculatus* were also more or less characteristic.

"3. Some differences were observed in the number, situation and form of the corrugations of chorion on the floats between some

sub-genera, *viz.*, Anopheles, Neomyzomyia and Pseudomyzomyia (as far as we know them).

" 4. The micropyle on the other hand seemed in all species to be built in the same way.

" 5. The eggs of *tessellatus* and *kochi*, that were until now supposed to be identical, could be distinguished from each other, *i.e.*, by the different breadth of the dorsal surface and of the frill.

" 6. The eggs of *A. annularis philippinensis*, about whose identity there existed some doubt, were described and proved to be the same as one of the batches described by CHRISTOPHERS and BARRAUD.

" 7. Eggs of *A. ludlowi* were obtained from Sumatra (fresh water) and from Batavia and Surabaja (salt water). The fresh water eggs showed some differences in length and number of ribs as compared with the salt water eggs (all taken together), but these differences were much smaller or non-existent between the fresh water eggs and the salt water eggs from Surabaja only, the latter being longer and having more ribs than those from Batavia.

" The pattern of the exochorion was the same in all eggs.

" 8. The eggs from *A. subpictus* from different places and especially from fresh and salt water showed big differences, consisting mainly in the pattern of the dorsal surface, the breadth of the frill and the number of ribs.

" To know for certain if we have to do with different races it will be necessary *i.e.* to breed them in more generations in order to see if those properties are hereditary.

" 9. The eggs of most species described here were the same as those from British India described by CHRISTOPHERS and BARRAUD, but some showed differences, *viz.* :—

" *a. Annularis typicus.*—The eggs here were smaller, showed a distinct double curve of the outline of the dorsal surface near the float terminations, not described by CHRISTOPHERS and BARRAUD, and also practically not indicated in their drawing ; and on the dorsal surface in most specimens of all the batches there could be seen a tigerlike pattern.

" *b. Vagus.*—It is possible that the frill of the *vagus* in this country is smaller than that in British India. At any rate it does not pass over the floats. And furthermore there is here a little distance between float and frill not existing in British India.

" *c. Subpictus.*—There was a big difference in the size of this egg compared with that from Bengal, where it is much larger (resp. 469 and 660 μ). The number of ribs was here much smaller, resp. 20·1 against 30–40 over there. The frill seemed somewhat different in structure. At any rate it was not ' slightly opaque or milky ' here, nor ' stiff and thick,' but clear and fine.

" As between the *A. subpictus* from British India and the one from this country there exists also a biological difference, *viz.*, that the one from British India does not carry malaria in nature while in this country it does, it is suggested that we may have to do here with a race (races) different from that in Bengal."

POGGI (Igino). La colorazione vitale delle uova di *Anopheles maculipennis* nella differenzazione delle singole varietà.—*Arch. Ital. Sci. Med. Colon.* 1935. Oct. Vol. 16. No. 10. pp. 722–726. With 3 figs. (2 coloured on 1 plate).

Monier (H.) & Treillard (M.). *Anopheles* (*Myzomyia*) *funestus* var. *imerinensis* var. n. de Madagascar. [*Anopheles* (*Myzomyia*) *funestus* **var.** *imerinensis* **a New Variety in Madagascar.**]—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 572–573.

The authors describe an anopheline captured in large numbers at Antananarivo; they regard it as a new variety of *A. funestus* and have named it *imerinensis*. *W. F.*

Simpson (George) & Anderson (Archie S.). **Quinine Amaurosis.**—*Med. Jl. Australia.* 1935. Aug. 31. 22nd Year. Vol. 2. No. 9. pp. 290–291.

A case of complete but transient blindness.

A woman, 36 years of age, took about 50 grains of quinine with the object of terminating an unwanted pregnancy. She awoke next morning completely blind, but without tinnitus or any other sign of quinine poisoning. At 10 a.m. she was unable to distinguish light from darkness, and her pupils were widely dilated and fixed. Two and a-half hours later she could see a little, and by the next morning her vision appeared quite normal. No changes were found in her fundi then, or at a detailed examination made 18 days later. In many of the reported cases, a permanent constriction of the visual fields resulted, but in this instance there was none. In some cases, constriction of the retinal vessels occurs, in others, as in this case, the fundus is normal, and on these grounds it has been suggested that the quinine acts directly on the visual nerve elements. *W. F.*

Prescriber. 1935. Sept. Vol. 29. No. 9. pp. 271–284. [48 refs.]—Malaria: Abstract Reviews of Current Literature. [Therapeutic Progress.]

Copeland (A. J.). Malaria and Racial Extinction. [Correspondence.]—*Lancet.* Sept. 21. pp. 691–692.

LEPROSY.

LEPROSY REVIEW. 1935. Oct. Vol. 6. No. 4. pp. 149–197. With 8 figs. on 2 plates.—Quarterly Publication of the British Empire Leprosy Relief Association, 131 Baker Street, London, W.1. [2*s*.]

An account of the Leprosy Institutions of Nigeria by H. C. ARMSTRONG. Itu is the largest settlement, under Dr. MACDONALD, with 1,600 inmates, each member of which has to do five hours' work on farms or the settlement industries for each injection he receives. The majority of the houses are also built by them. Goats supply milk, a liberal amount of which helps treatment. Road making, etc., provides work for all capable of it. A school for 150 children and night educational classes are provided, together with a Scout and Girl Guide movement, various games and a brass band. A church of Scotland to hold 1,300 has been built at a cost of £130. Babies born in the settlement are removed at once to a " clean " babies home, where their mothers go to suckle them with careful precautions to limit contact as much as possible. Treatment is carried out twice a week.

Another settlement at Uzuakoli with nearly 500 inmates, is supported from local administrative funds and provided with a medical officer by the Primitive Methodists, at a total cost of £4 a head *per annum*, for most of their food is grown on their own farm. Weekly injections are given. A new settlement has just been completed by the Nigerian Government at Ossiomo for 400 patients under the charge of a medical officer and a European sanitary inspector with public works experience. It is considered to be important to attract earlier cases to the colonies, as too many of the admissions are patients in an advanced stage who have been driven out of their villages, and will already have infected others.

Leprosy in South America is dealt with by W. E. BROWNING. The first Leprosarium in the New World is believed to have been founded near the beginning of the seventeenth century at Cartagena in Colombia. The following data regarding the present incidence of leprosy in South America are given.

Venezuela. Population 3,000,000; cases several thousand. A few hundred in two official leprosaria.

Colombia. Population 8,000,000. Probably about 30,000 cases. Over 4,000 in three leprosaria, but little expert treatment provided.

Ecuador. Population 2,000,000. Possibly several thousand cases but no data. One small leprosarium.

Peru and Bolivia. Little leprosy, mostly in warmer Amazon basin.

Chile. Mainland free from leprosy. Small colony on Pacific Easter Island.

Argentina. Population 12,000,000. Estimates of cases vary from 4,000 to 10,000. Census revealed 2,500 with only 250 in institutions. Most in warmer northern provinces.

Uruguay. Population 1,500,000. Recent estimate of over 500 cases. Under care 40.

Paraguay. Population 800,000. Cases 4,000 to 10,000. Leprosarium of 2,500 acres provided and under construction.

Brazil. Population 45,000,000. Cases not under 50,000. Many leprosaria.

The author thinks a total estimate of 100,000 lepers in South America is as exact as possible at the present time.

The vexed question of relapses in leprosy is considered, mainly from a theoretical point of view, by G. R. Rao in the next paper. He suggests that the term "disease arrested with deformities" should be substituted for "burnt out cases," He records four cases in which amputation of a septic foot in advanced quiescent nerve cases was followed by a recrudescence of the disease, and he gives a table of 20 relapses, 16 of which were neural cases. He thinks it probable that an "unrecognized non-acid fast neurotrophic virus form of *M. leprae*" exists.

D. P. Dow and J. S. Narayan suggest that gonorrhoeal arthritis may easily be mistaken for lepra reaction by lowering resistance.

E. S. R. Alfred advocates giving fluorescein injections during intervals in the use of ethyl esters with a view to lessening the frequency and duration of lepra reactions after prolonged use of esters.

L. Rogers.

Leprosy Review. 1936. Jan. Vol. 7. No. 1. pp. 1–50. With 6 figs. (4 on 2 plates).—Quarterly Publication of the British Empire Leprosy Relief Association, 131 Baker Street, London, W.1. [2*s*.]

This is the first issue of this publication to be edited by Dr. E. Muir, now Secretary of the British Empire Leprosy Relief Association. The following are the principal original articles in it. The Editor discusses the probable number of lepers in the world and concludes that they may be placed at two to four millions, the larger figure including early not easily recognizable cases. He points out that while clinics for out-patient treatment are suitable for such densely populated countries as India and China, in the more backward tropical African countries the colony system is the best.

Bacillaemia in leprosy is discussed by H. V. R. Mostert, who found they could be demonstrated in thick blood films more easily with Munch's modification of the Gram method than with the Ziehl-Neelsen method. He found them in all of five cases during an acute exacerbation, and as a rule only in nodular cases, while the method is of no practical value in diagnosis as the bacilli are much more easily demonstrated in the skin. In 48 per cent. of the positive cases the Wassermann reaction was also positive. They are most often found in the large mononuclear cells, and their presence in the blood is a very unfavourable sign.

F. G. Rose records a brief reply to the critics of his paper on the Curability of Leprosy, and points out the errors some of them have fallen into. His twenty years' experience of work on leprosy leaves him in no doubt regarding the great benefits of the modern treatment.

A note on anti-leprosy work in the Punjab by S. S. Jaikara is of local interest only. The remaining articles are extracts from other journals and newspaper cuttings.

L. R.

Leprosy in India. 1935. Oct. Vol. 7. No. 4. pp. 147–191. With 5 plates & 9 figs.—Issued quarterly by the Indian Council of the British Empire Leprosy Relief Association.

J. Rodriguez describes under the old term "lazarine leprosy" cases characterized by the formation of blisters, in the absence of burns or

rubbing, the fluid of which contains numerous acid-fast bacilli, and which tend to go on to deep sloughing ulceration, but without the usual signs of acute lepra reaction. Photos of the late stages are given.

D. P. Dow advocates the use of massage, electricity and diathermy in the treatment of the contractures of leprosy, and he describes and illustrates three cases with improvement in the condition of the hands.

E. B. Christian records a study of family transmission of leprosy as seen at the Dichpali Leprosy Hospital, with a view to ascertaining if bacteriologically negative, as well as positive, cases can transmit the disease. A table gives the data of 57 families to show that in only 13 were both parents infected, in most of which there was a previous history of leprosy in both families, so conjugal infections were rare. Further in 11 families with one neural, non-infectious parent none of the 23 children showed any sign of leprosy, but of 110 children with one or both parents an infectious cutaneous case of leprosy no less than 101, or over 90 per cent., showed definite signs of the disease. Further the older the child when first exposed to infection the less likely is he to contract the disease. The two sexes suffered equally among the children. Infectious leper servants may also infect children. *L. R.*

Arquivos da Escola Médico-Cirurgica de Nova Goa. Ser. B. 1935. No. 6. pp. 1381–1554. With 7 plates. A campanha antileprosa na India Portuguesa. [**The Anti-Leprosy Campaign in Portuguese India.**]

[Matter of general interest in this long report is very limited. Four-fifths are taken up with subscription lists and accounts of the opening and other ceremonies connected therewith nearly 9 years ago, even to the extent of giving details of the musical programs on ten occasions.]

The Central Leprosarium, Goa, was opened in May 1932 with 12 patients. In a table is given an analysis by age and sex of 107 examined in 1934. Sixty-six were males, 41 females ; 41 of the former and 31 of the latter were between 21 and 45 years of age ; there were none under 5 years and only 3 (all males) under 10 years of age. In a later chapter brief notes are given of 109 patients admitted between 17th May 1932 and the end of 1934. The subject of treatment is disposed of in a brief chapter of 5 pages, and the actual methods employed in 2 pages. The following have been tried : —

(1) Injection of cultures of Friedmann's bacillus and application by inunction, in 4 cases. No result was obtained.

(2) Antimonials, Sdt. 386 and Sdt. 386 B 6, were found to set up phlebitis. Stibenyl brought about slow cicatrization of ulcers ; better results were obtained from intravenous injection of 1 per cent. mercurochrome.

(3) Methylene blue has proved disappointing, but the "moral" effect of the coloration of the nodules is good in making the patients think that cure is beginning.

(4) Chaulmoogra and its derivatives have proved of most service.

At present the plan followed is in the first place hygienic régime—good food, baths, rest, tonics, treatment of concomitant diseases such as malaria, dysentery, etc.—and dressing of ulcers. After 2–3 months of such preliminary measures specific remedies are started, as weekly intravenous injections of mercurochrome 1 per cent., 0·5 cc. rising by the same to 4 cc. for ulcers ; alepol intravenously 1 cc. increasing to

5 cc. of 1 per cent. solution ; chaulmoogra oil, or ethyl esters, etc., the latter intramuscularly, the former in capsules with tablets of alepol in the intervals. *H. H. S.*

Sainte Marie (P. E. Flye). La lèpre au Maroc. Revue générale. [**Leprosy in Morocco.**]—*Internat. Jl. Leprosy.* Manila. 1935. July–Sept. Vol. 3. No. 3. pp. 315–326. With 1 map. [26 refs.]

After reference to previous inquiries in Morocco the author is able to add 190 cases he had observed to bring the total in North Morocco up to 330. No part of the country is free, but the two main foci are in the North, and among the Doukkala tribe in the South with some 300 cases ; so the total is about 600. In the capital of Fez there are a number of pilgrim lepers. There is no restraint on their movements, and it is advised that they should be isolated under favourable conditions (but not imprisoned), preferably in agricultural colonies with treatment, and that the children should be from birth isolated in a special home. *L. R.*

Graham-Yooll (M. A.). **Notes on the Leper Colony at Berhala, Sandakan, North Borneo.**—*Jl. Roy. Nav. Med. Serv.* 1935. Oct. Vol. 21. No. 4. pp. 334–342. With 5 figs.

The author visited, with the principal Medical Officer, the North Borneo Leper Settlement on the island of Berhala close to Sandakan. During the last five years the cases have increased from 53 to 72, mostly Chinese. A brief account is given of the usual types of the disease, and the patients are treated by injections of Muir's creosoted hydnocarpus oil and by alepol at weekly very welcome visits of the medical officer. The prognosis is naturally better in the early cases. *L. R.*

Strachan (P. D.). **The Effect of Compulsory Segregation of Lepers in Basutoland.**—*South African Med. Jl.* 1935. Aug. 24. Vol. 9. No. 16. pp. 554–555.

In 1895 Dr. Long found not more than 200 leprosy cases in Basutoland, but when the leper asylum was opened in 1914 strenuous efforts of the chiefs resulted in 600 being admitted. In the mountainous Qachas Nex district the incidence is twice as high as in the more agricultural western areas, and the cases are more difficult to isolate. The improvement in economic conditions tends to decrease leprosy, but the administration efforts are counterbalanced by over-population. It is argued that on the law of compound interest " it is highly probable that in the period of 19 years the number of leprosy patients in the territory was trebled." Advanced cases are now rarely seen outside the asylum, and it is estimated that at the end of 1934 there could not be over 300 early cases outside, although apparently no surveys have been made, and it is argued that the 600 badly infected cases would in the 21 years to date have increased to 2,020, or more than double the present estimated numbers and of a worse type. The conclusion is come to that although " The cost of the Asylum has been a terrible drain on the resources of the territory," an extension of the present more successful inspectorate system of finding cases in the form of general health visitors " would eradicate leprosy sooner than any other system." *L. R.*

CARTRON. Etude sur la lèpre, dans la circonscription de Dschang (Cameroun). Bamoums et Bamillékés. [**Leprosy Incidence in Dschang (Cameroons).**]—*Ann. de Méd. et de Pharm. Colon.* 1935. Jan.–Feb.–Mar. Vol. 33. No. 1. pp. 5–24.

The author found in the Dschang district 1 per cent. of 450,000 people infected, and 600 are isolated. In Grasfield there are at least 3,000, 1,500 being severe cases. *L. R.*

NOLASCO (J. O.). **The Leprosy Problem in the Philippines and Leprosy in Norway.**—*Jl. Philippine Islands Med. Assoc.* 1935. July. Vol. 15. No. 7. pp. 349–357.

The heavy cost of leprosy segregation in the Philippines has led the newly constituted Philippines Legislative Council to pass an Act " supposed to be patterned after the Norwegian system, but disapproved by the Governor-General." The author therefore draws attention to the great advantages Norway had of 77 years trial of isolation with home segregation not suitable to the Philippines, and about one-tenth the number of lepers, not living in a number of islands as in the Philippines ; for these great differences make a fair comparison impossible. The Philippine plan has at least removed advanced cases from the towns, and now many admissions are voluntary for the sake of treatment in early stages, as compared with those isolated in the earlier years of the tests, and the larger numbers lately are no evidence of any increase of the disease, which at least appears to have been checked. Moreover the recent modifications of starting treatment centres and skin dispensaries for treatment of the earlier cases, together with the release of segregated ones which have become uninfective, has removed most of the objections of the people to the present measures, which deserve to be continued to give them a fair trial. Unfortunately two of the new treatment centres have been closed on grounds of economy.

L. R.

AUSTIN (C. J.). **The Problem of Leprosy in Fiji.**—*Native Med. Practitioner.* Suva. 1935. Sept. Vol. 2. No. 3. pp. 290–292.

The author had previously stressed the importance of early diagnosis in relation to prognosis and the eradication of leprosy, to allow of treatment in time to prevent the patient becoming infective to others. The want of this is shown by the number of advanced cases sent to the Makogai settlement. The native medical practitioners should also examine all contacts periodically for at least five years to detect and treat early cases, as well as discharged cases to find relapses. If these measures were regularly carried out " leprosy in Fiji will soon become a disease of the past." *L. R.*

YU (K. Y.). **Indigenous Cases of Leprosy in Manchuria. Report of 4 Cases.**—*Chinese Med. Jl.* 1935. July. Vol. 49. No. 7. pp. 644–651. With 4 figs. on 1 plate & 1 map.

An earlier partial survey had failed to find a single indigenous case of leprosy in Manchuria, but four such cases are now reported among 23 new ones. *L. R.*

Dostrowsky (A.). **The Control of Leprosy in Palestine.**—*Harefuah.* Jerusalem. 1935. Sept.–Oct. Vol. 9. No. 5 (53). [In Hebrew. English summary pp. 6–7.]

This brief note records that from the establishment of the Lepers home in Palestine in 1896 up to 1927, 261 cases were treated, but 33 more were seen up to 1933, over 50 per cent. residing in Jerusalem. Of 26 Orientals 19 were born in Palestine. Chaulmoogra derivatives treatment is used, and isolation is considered imperative, and the disease is curable in the early stages. Examination of all the villagers where a leper is found is recommended. *L. R.*

Welch (T. B.). The State and Lepers in Malaya.—*East African Med Jl.* 1935. Feb. Vol. 11. No. 11. pp. 353–356.

Burnet (Et.). Un centre international d'étude de la lèpre. [**An International Centre for the Study of Leprosy.**]—*Bull. Acad. Méd.* 1935. Dec. 24. 99th Year. 3rd Ser. Vol. 114. No. 42. pp. 846–850.

This brief paper announces the formation of the first centre for the scientific study of the leprosy problem in South America at Rio de Janeiro with the help of the League of Nations, under the charge of the dermatologist, Dr. Ed. Rabello, who has studied the serology of leprosy. The co-operation of the Oswaldo Cruz Medical Research Institute, and of the well organized leprosy isolation institutions of the S. Paulo State with 5,000 cases in colonies, in which all the known infectious cases are under care, has been obtained. *L. R.*

Tolentino (Jose G.). **Sex Susceptibility in Leprosy.**—*Jl. Philippine Islands Med. Assoc.* 1935. July. Vol. 15. No. 7. pp. 374–377.

The author records his experience on this point at the Cebu treatment centre. For this purpose he made a survey of the incidence of the disease in 594 families, in 40 of which one or both parents were the source of infection. Of 132 sons 37, or 28·03 per cent., and of 119 daughters 21, or 17·65 per cent., became infected, so he agrees with Y. Hayashi (with 45 per cent. of sons and 32 per cent of daughters) that males are more susceptible than females, all ages being included. He agrees that among children the sex incidence is equal, and he suggests that "in adults the sex hormones in females directly or indirectly render them relatively more resistant to infection than the males." He also thinks the demand of the system during puberty for iodine accounts for the frequent development of lesions at that time.

L. R.

Moiser (B.). **Tuberculoid Leprosy in Southern Rhodesia.**—*Internat. Jl. Leprosy.* Manila. 1935. July–Sept. Vol. 3. No. 3. pp. 279–282. With 3 figs. on 1 plate.

Since the visit of H. W. Wade in 1931, when one case of tuberculoid leprosy was found among 300 inmates, the author has met with only 6 out of about 700 patients; so the condition is rare in S. Rhodesia, while he had never noted such a case when previously working at leprosy in Nigeria. He notes a peculiar purplish colour of the lesions in

some of his patients, which, together with the raised edges, enables cases to be easily recognized. He agrees that acid-fast bacilli are rarely present, and the cases yield readily to treatment by intramuscular injections of iodized esters. *L. R.*

Schujman (Salomon). "Lepra tuberculoide." Contribución a su estudio clínico e histopatológico. [**Tuberculoid Leprosy. A Clinical and Histological Study.**]—*Prensa Méd. Argentina.* 1935. Dec. 4, 11, 18 & 25. Vol. 22. Nos. 49, 50, 51 & 52. pp. 2347–2365; 2406–2424; 2465–2476; 2504–2518. With 71 figs. [15 refs.]

This long article does not permit of useful abstraction. It is concerned with the histories, clinical characters and general details of 21 cases of leprosy presenting tuberculoid lesions. The question of differential diagnosis from lupus, psoriasis, lichen, syphilis and other conditions is briefly discussed. The article is embellished with photographs and photomicrographs; the majority of these are well reproduced and very clear, demonstrating the clinical states of the patients, the macroscopic appearance of the lesions and the histological changes shown in sections obtained of tissue taken by biopsy.

The author shows that these cutaneous lesions are accompanied or characterized by altered sensibility, often resemble those of lupus and are very frequently bacteriologically negative [in so far as the bacilli are difficult of demonstration, they are present but are very few and sparse]. Clinically, the prominent, infiltrated margins of the lesion with altered sensation are highly characteristic, the centre being flat, atrophic or slightly achromic. The epidermis is often thin and sometimes atrophic, but the basal layers are infiltrated and the upper layers invaded by the infiltration. Commonly, the infiltration is around the hair follicles or sebaceous and sweat glands, and there is perivascular infiltration with swelling and proliferation of the vascular endothelium. In some cases the lesions appear to be a transitional stage to the formation of lepromata. Further investigation to determine whether this is so is to be undertaken. *H. H. S.*

Dubois (A.); Cochrane (R. G.); Rodriguez (José); Fraser (N. D.). **The Abortive Case.** [Correspondence and Comments.]—*Internat. Jl. Leprosy.* Manila. 1935. July–Sept. Vol. 3. No. 3. pp. 357–360.

Dubois raises the question of how to deal with patients presenting a single small leprous looking macule which remains stationary for years, and considers they should be watched without treatment. Cochrane agrees, but Rodriguez questions the diagnosis in some such cases, and Fraser considers that it is not justifiable to withhold treatment, as some of them may be early leprosy which would develop if left alone.

L. R.

Des Essarts (J. Quérangal) & Lefrou (G.). Les sarcoïdes de la lèpre. [**Sarcoid Lesions in Leprosy.**]—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 626–639. [17 refs.]

The authors describe under this term lesions showing the structure of tuberculoid leprosy with epitheloid and a few giant cells without caseous changes, but in which the lesions may have advanced to a

papular or nodular stage. Notes of eleven cases are given and the histological changes described in detail, in six of them in the macular stage no leprosy bacilli were found, but they were present, in small numbers usually, in the five papular cases. The differential diagnosis is discussed, and the condition is considered to be a peculiar tissue reaction to Hansen's infection. *L. R.*

Chiyuto (Sulpicio). **Early Leprotic Changes in Children and their Bearing on the Transmission and Evolution of the Disease. III.**—*Monthly Bull. Bureau of Health.* Manila. 1935. July. Vol. 15. No. 7. pp. 217–234. With 1 chart. [16 refs.]

The author adds 42 new cases to the 40 he previously reported showing lesions, which he regards as very early bacteriologically negative signs of commencing leprosy, with a view to a study of the evolution of the disease and their bearing on transmission. In the case of the multiple hazy depigmented macules in 71·9 per cent. they became more visible, in 46·3 per cent. the border became slightly thickened, but in only 7·3 per cent. advanced to typically infiltrated pinkish macules, while in 8·5 per cent. tuberculoid zones were noted. Papulo-vesicular eruptions were confirmed as leprotic in 47·6 per cent. Minute pale follicular papules were interpreted as leprotic in 15·6 per cent. Superficial neurological changes, although not the first sign, were the first alarming symptoms in 57·8 per cent. His work supports the theory of infantile infection and adult immunity. *L. R.*

Rodriguez (Jose). **Relapse of Leprosy under Controlled Conditions.**—*Internat. Jl. Leprosy.* Manila. 1935. July–Sept. Vol. 3. No. 3. pp. 333–336.

This brief report records that four out of five "negative" paroled leprosy patients living under good conditions with antileprosy treatment relapsed after from 4 months to 3 years. *L. R.*

Veerasingham (K. V.) & Rasanayagam (S.). **Preliminary Observations on the Problem of Early Leprosy among Immigrants.**—*Malayan Med. Jl.* 1935. June. Vol. 10. No. 2. pp. 51–52.

At the Malayan Pulau Jerejak leper settlement 92 per cent. of the inmates are of foreign birth with 783 Chinese and 142 Indians, while 67 Chinese and 12 Indians were local born. During 1934 about 3,000 cases were treated at local institutions, and it is believed that the numbers are increasing, chiefly due to increased intake. Eurasians numbered 20 and Malay races 133. Late in 1934 a special examination was made at the Pulau Jerejak quarantine station for early leprosy among immigrants from S. India and 67 cases, 0·78 per cent., were detected among 8,537 adults, 65 of whom were early neural or maculo-anaesthetic, and only 2 of the cutaneous type. They were all repatriated at the expense of the agents. *L. R.*

Muir (E.) & Chatterji (S. N.). **Bernhardt's Syndrome.**—*Indian Med. Gaz.* 1935. Apr. Vol. 70. No. 4. pp. 192–193. With 1 text fig.

A brief paper pointing out that an anaesthetic area in the upper outer thigh distribution of the lateral cutaneous nerve, described by Bernhardt as due to constriction of the nerve by fibrositis of the muscle it passes through, or to syphilis, gonorrhoea or septic conditions, may

be mistaken for leprosy, but the absence of any other leprous lesions will exclude that disease. Brief notes of 12 such cases are given.

L. R.

Ribeiro (Leonidio). Um caso de lepra descoberto pela dactyloscopia. [**Leprosy discovered through Dactyloscopy.**]—*Folha Med.* 1935. Oct. 25. Vol. 16. No. 30. pp. 489–492. With 5 figs.

Detection of crime or discovery of criminals by finger-print identification is a matter of universal knowledge ; the case here recorded is, as it were, a corollary of this—discovery of leprous infection by alteration in finger-print. The subject was a woman who went as servant to Professor da Fonseca in 1919 at the age of 16 years. Being unable to write she signed certain papers for the bank with her right thumb impression. In August 1935, *i.e.* 16 years later, wishing to take out some of the deposited papers, she was called upon to prove her identity by the thumb impression. A comparison was made but was not satisfactory and she was in danger of prosecution for attempted fraud. She was taken to Professor da Fonseca for identification, who examined first the thumb-prints and then the patient and the diagnosis of leprosy was next day confirmed by Professor Rabello. *H. H. S.*

Vespoli (Miguel). Ensaio de pathologia da lepra superinfecção. [**Superinfection in Leprosy.**]—*Rev. Leprologia de São Paulo.* 1935. Sept. Vol. 2. No. 3. pp. 173–184.

The author gives details of three cases of leprosy, all primarily of the nervous type, in whom after intervals of some years, 5 or more, other symptoms, of the nodular form, developed. The author concludes :—

1. It is undeniable that superinfection occurs in leprosy as in other infections.
2. Endogenous re-infection (superinfection) plays a large part in the evolution of leprosy.
3. Superinfection, as a factor in transforming latent into manifest disease, or of converting a quiescent case into one excreting bacilli, must not be underrated when we consider prophylactic measures. *H. H. S.*

Esser (P. H.). Psychose bij lepra. [**Psychoses in Leprosy.**]—*Nederl. Tijdschr. v. Geneesk.* 1935. Nov. 30. Vol. 79. No. 48. pp. 5554–5559. French summary (2 lines).

The psychoses which have been described as occurring in leprosy are : (1) the psychogenic psychoses ; (2) the exogenous symptomatic (toxic) psychoses ; (3) the remaining psychoses. To the first group belong the psychogenic depressions, the psychogenic paranoïd psychoses, " imprisonment " psychoses, etc. The second group comprises the psychosis of Korsakoff in leprous polyneuritis, leprous neurasthenia, the mental deficiency pictures and the toxic and cachectic deliria in the terminal stages of the disease. The third group is the largest, and is a group in which the leprosy is merely incidental, for example the occurrence of leprosy in schizophrenia. Some observers have maintained that there is a fourth group, the organic, due to destructive leprous lesions in the brain.

An illustrative case is cited of a young man with unsatisfactory upbringing and a drunken father who left Holland at an early age

to serve in India, led a dissolute life there and contracted leprosy. The disease was discovered after his return to Holland, where mental symptoms soon made their appearance. His case is describable as one of paranoïd psychogenic reactive psychosis in conjunction with mixed leprosy. There was no evidence of his condition being due to a leprotic lesion in the brain. *W. F. Harvey.*

Keil (Ernst). Lupus erythematodes discoides bei einem Leprösen.—*Arch. f. Dermat. u. Syph.* 1935. Sept. 20. Vol. 173. No. 1. pp. 34–36. With 2 figs.

Tisseuil (J.) & Berny (P.). Un enfant de 1 an, fils de lépreuse, porteur d'un nodule contenant des bacilles de Hansen.—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 549–550.

Walker (Ernest Linwood) & Sweeney (Marion A.). **Embryonic and Tumor Tissues as Culture Media for the Microörganism of Rat Leprosy.**—*Amer. Jl. Trop. Med.* 1935. Sept. Vol. 15. No. 5. pp. 507–513. [12 refs.]

After references to the work of others the authors describe their own results as follows. No multiplication of rat leprosy bacilli was obtained in minced embryonic tissues suspended in Tyrode solution. A pleomorphic acid-fast organism, identical with those they had obtained from human and rat leprosy did grow in those media, but better in a leaner medium than the minced embryo one. They suggest that the results claimed by others of cultures of lepra bacilli in these media were due to serial transfers of the abundant organisms, or to acid-fast organisms appearing in the cultures as contaminants.

L. R.

Cowdry (E. V.) & Heimburger (L. F.). **Morphology of Bacillus of Rat Leprosy.**—*Proc. Soc. Experim. Biol. & Med.* 1935. June. Vol. 32. No. 9. pp. 1422–1423.

On staining by Gersh's Ziehl-Neelsen method, involving the instantaneous freezing of the tissue by plunging into liquid air and dehydration *in vacuo* while still frozen, the author found that the acid-fast bacilli of both leprosy and tubercle showed smoother outlines and much less granular appearance. This would appear to be their normal condition. *L. R.*

Kikuth (W.) & Verfürth (D. H.). Ueber den heutigen Stand der Leprabazillenzüchtung. [**Present Position of Cultivations of** *Mycobacterium leprae.*]—*Deut. Med. Woch.* 1935. Sept. 6. Vol. 61. No. 36. pp. 1435–1438.

This is a review of literature on attempts to cultivate the leprosy bacillus, which contains nothing new. *L. R.*

Stevenel (L.) & Berny (P.). Un procédé de biopsie cutanée chez les lépreux. [**Obtaining Fragments of Skin for Examination for Leprosy.**]—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 547–548.

A simple method of obtaining a small fragment of leprous tissue for sectioning without much inconvenience or fright to the patient is thus described. A needle is inserted into the superficial layer of

the skin parallel with the surface and the point made to emerge one or two millimetres from the point of entrance. A thin portion of the skin is thus raised and a slice removed by a razor following the direction of the needle as closely as possible. The insignificant wound is covered with collodion and cotton wool. *L. R.*

SABIN (F. R.), SMITHBURN (K. C.) & THOMAS (R. M.). **Cellular Reactions to Waxes from** *Mycobacterium leprae.*—*Jl. Experim. Med.* 1935. Dec. 1. Vol. 62. No. 6. pp. 771–786. With 4 figs. on 1 plate.

This technical paper describes the cellular reactions to the intraperitoneal injection into rabbits of five preparations of the waxy substances separated from cultures of an acid-fast strain of *Myco. leprae* isolated from a case of leprosy. The authors conclude that, like the waxes of the tubercle bacilli, those now tested are remarkable stimulants to cells. The crude wax is a mixture of lipoids and other materials and gives reactions similar to the response to the tuberculo-polysaccharide, phosphatide and wax; as does the wax obtained from purification of the lepra-phosphatide, but with more giant cells. Leprosin, though a glyceride, corresponds to the unsaponifiable material from the tubercle bacillus. It stimulates both fibroblasts and monocytes, and the latter fuse into foreign body giant cells to engulf the wax. The cellular reaction to the leprosinic acid and to the crystalline alcohols is one of the foreign body giant cell. *L. R.*

ANDERSON (Hamilton H.) & ANDERSON (Jeanette van D.). **Iodine Values and Total Lipids of Leprous Human Blood Sera.**—*Proc. Soc. Experim. Biol. & Med.* 1935. June. Vol. 32. No. 9. pp. 1470–1473.

The authors have determined the iodine values and serum lipids of leprous patients receiving chaulmoogra therapy with the following results :—

Average Iodine Values and Total Lipids of Blood Sera of 53 *Patients under Treatment for "Cuta-neural" (Mixed) Leprosy at Palo Seco Leper Colony, Panama.**

Stage and Course of Disease.	No. of patients.	Av. age in years.	Av. weight in kilos.	Av. hgb. gm/100 cc.	Probable average duration of disease in years.	Probable av. amount of chaulmoogra esters given in kilos.	Iodine Value.	Total lipid Gm./100 c
Early Predominantly Cutaneous Leprosy†	18	30·1	57·2	12·15	4·1	1·44	50·1±13·6	0·995±0·1
All Stages—improving‡	13	30·4	59·9	11·85	5·3	1·57	54·5±18·1	0·813±0·1
Advanced—stationary	11	31·9	56·2	11·02	9·4	2·25	66·9±14·1	0·720±0·2
All stages—advancing	11	33·1	58·7	12·67	9·8	2·74	77·8±19·8	0·572±0·1

*Normal values: Total lipids, 0·589 Gm./100 cc.; Iodine value of total fatty acids, 88. (Bo E. M., *J. Biol. Chem.*, 1933, 101, 323.)
Average values for 53 leprous patients: Total lipids, 0·805±0·161 Gm./100 cc. Iodine val 58·5±15·9.
†Three patients untreated.
‡One patient with lepra fever. Iodine value, 31·2; total lipids, 1·016 Gm./100 cc.

Advanced treated cases showed greater unsaturation of the blood fatty-acids and lower total lipids, but the findings are masked by the large amounts of chaulmoogra administered. *L. R.*

Spindler (A.). **The Pathogenesis of Leprosy.**—*Internat. Jl. Leprosy.* Manila. 1935. July–Sept. Vol. 3. No. 3. pp. 265–278. With 1 fig. [12 refs.]

Under this heading the author discusses the mode of infection of leprosy, and comes to the conclusion that it is due to exposure to infection by a leper after the importation of a case into a previously unaffected area, aided by a predisposition, as only a small percentage of exposures result in actual infection. He thinks this predisposition is hereditary. *L. R.*

Gomes (J. M.). **The Gomes Complement-Fixation Test in Contacts of Lepers.**—*Internat. Jl. Leprosy.* Manila. 1935. July–Sept. Vol. 3. No. 3. pp. 283–290.

Observations on 56 cases led to the following conclusions. The test is not absolutely specific as fixation occurs in cases of tuberculosis, ozaena, deep mycosis, tropical ulcer and leishmaniasis ; but all except tuberculosis present characteristic differential symptoms. In the search for home infections among the contacts of leprous persons such serological evidence is of great importance, for the search for lepra bacilli in lymph nodes is difficult to carry out and the organisms are only occasionally found there. *L. R.*

van den Branden (F.). Réaction de déviation du complément et réaction de floculation effectuées simultanément sur du sérum de lépreux. [**Complement Fixation and Flocculation Tests in Leprosy.**]—*Ann. Soc. Belge de Méd. Trop.* 1935. Sept. 30. Vol. 15. No. 3. pp. 391–396.

After references to some previous French observations, the author records that he obtained 36 per cent. of positive results with the Kahn reaction and 22 per cent. with the Bordet-Wassermann, while two sera were anti-complementary. He thinks the positive reactions are mainly due to the great prevalence of syphilis and yaws in the Belgian Congo. *L. R.*

Dubois (A.) & Degotte (J.). Séroflocculation syphilitique chez les lépreux (spécialement antigène-Bruxelles-floculation). [**Sero-flocculation in Leprosy.**]—*Ann. Soc. Belge de Méd. Trop.* 1935. June 30. Vol. 15. No. 2. pp. 201–207.

The authors report on seroflocculation by three methods, that of Meinicke (M.T.R.), of Kahn and with the Antigen-Brussels-Flocculation (A.B.F.) in non-syphilitic and in syphilitic and yaws infected non-lepers and lepers, and record tables of their results, from which they come to the following conclusions : Positive reactions are evidence of infection with syphilis or yaws, for in accordance with the preceding history there is a difference between those with a positive and a negative history of those diseases in the results of from +25 to +70 per cent. The percentage of results is approximately the same whether lepra bacilli are rare or numerous, which should not be the case if the leprosy infection influenced the results. The great

frequency of yaws doubtless explained the positive results that were met with in lepers, for the positive results in lepers of about 50 per cent. is the same as in the general run of patients in the hospital. Treatment with anti-syphilitic remedies should furnish confirmation. The Kahn method appears to be the most specific of those tested, the A.B.F. one the least so; this result is in agreement with the findings of Bernard and Van den Branden. *L. R.*

LIMA (Lauro de Souza). A sorologia da sifilis em face do tratamento antileprotico. [**Serological Tests for Syphilis in Lepers under Treatment.**]—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 183–185.

MONTSERRAT has stated that leper patients whose sera are positive by the Wassermann or Kahn tests for syphilis may become negative as the result of prolonged administration of oil of chaulmoogra. The author proceeded to test this on patients at his leprosarium. Forty-seven were chosen in whom syphilis was suspected and whose sera gave a positive W.R., and 17 others Kahn positive. After treatment with chaulmoogra for periods of 6 to 24 months (total dosage of 100–500 cc.), the reactions were tested again. Of the W.R.+, 11 were unchanged, 36 showed a reduction, and of the 17 Kahn+ the corresponding figures were 4 and 13. He therefore postulates two questions: 1. How can we confirm a suspected diagnosis of syphilis in lepers? 2. What guide have we of the results of antisyphilitic treatment in lepers?

At the Padre Bento Sanatorium the rule appears to be to group the patients as follows:—

1. Those with a clinical history indicating syphilis and confirmed by a positive serum test. They are treated for syphilis and leprosy alternately; an insoluble salt of bismuth (the hydroxide) is given for 1½ months, then 2 months' interval during which the treatment for leprosy is given.

2. Those with a doubtful clinical history of syphilis, whose serum is negative. Here the difficulty is great and the usual rule is to give six injections of bismuth, note the result and test the blood again, 14 days after the last injection. [Presumably, if the symptoms clear the syphilitic diagnosis is confirmed; if not are the symptoms to be regarded as due entirely to the leprosy, if the W.R. remains negative, as it probably would if it was so before the bismuth was given? The reason for testing the reaction again is not obvious.]

3. Those with a clinical history of syphilis, whose sera give varying results. Treatment of these is guided by the Kahn reaction: (*a*) If the leprosy is of mild form and the Kahn negative the syphilitic aspect is disregarded. (*b*) If the Kahn is + or ++, antisyphilitic treatment is started if that for leprosy appears to be doing no good. (*c*) If a strongly positive, +++, antisyphilitic treatment is taken in hand whatever the stage or condition of the leprosy. *H. H. S.*

FABIANI (G.). La valeur des réactions de gélification sérique au cours de la lèpre humaine. [**The Value of the Formol-Gel Test in Human Leprosy.**]—*C. R. Soc. Biol.* 1935. Vol. 120. No. 29. pp. 13–14.

The gelification of sera on the addition of 2 drops of 40 per cent. formaldehyde or 0·1 per cent. lactic acid in leprosy is reported on.

The author concludes that the reactions with both agents give parallel results of very variable degrees, but the test is of little practical value because similar results are obtained in tuberculosis, syphilis and kala azar. *L. R.*

Bier (Otto G.). Ueber die Serologie der Lepra. IV. Einfluss der Temperatur auf die Reaktionsfähigkeit des Lepraserums mit Tuberkulose- und Lues-Antigen. [**Serology in Leprosy. Reactions of Antigens of Tuberculosis and Syphilis with Leper Sera.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Dec. Vol. 39. No. 12. pp. 516–519.

The author reports having obtained 60 per cent. of reactions with lepra tubercle antigens of Witebsky, Klingenstein and Kuhn. *L. R.*

Besta (Bruno) & Mariani (Giacomo). Il valore pratico della reazione di Rubino per la lebbra, studiato in Somalia. [**Rubino's Reaction among Lepers in Italian Somaliland.**]—*Giorn. Ital. di Malat. Esot. e Trop.* 1936. Jan. 31. Vol. 9. No. 1. pp. 11–14.

The first part of this article gives a review of the results of Rubino's reaction which have been reported by investigators in different parts of the world. The authors next describe the technique of the modified form, R.R.II, and the scheme which they followed; this is set out in the subjoined table.

Tube	1	2	3	4	5	6
Serum	0·50	0·25	0·10	0·50	0·25	0·30*
Saline	0·30	0·55	0·70	0·30	0·55	0·70
Formolized suspension ...	0·20	0·20	0·20	—	—	—
Saline suspension	—	—	—	0·20	0·20	0·20

* So in table, but probably a misprint for 0·10—Ed.

They find that waiting for an hour before reading the results does not give safe results; they read after 15, 30 and 50 minutes. They examined 400 sera: 301 normal, 29 syphilitic, 10 from tuberculous patients, 10 with chronic malaria, 46 proved lepers and 4 suspected of leprosy. None of the 350 in the first four of these gave a positive. Of the 46 from lepers, proved to be such both clinically and bacteriologically, 24 only (52 per cent.) gave a positive, 22 (48 per cent.) were negative. Fourteen of the 46 were nodular cases and only 4 were positive; of 12 nerve cases only 2, but of 20 with the mixed forms 18 were positive. In general, the more advanced the stage of disease the greater the proportion positive. [No further reference is made to the 4 suspected cases.] Treatment seemed to have little effect on the result. The reaction, therefore, has little value either in diagnosis or in evaluating the results of treatment. [See also this *Bulletin*, 1930, Vol. 27, p. 1006; 1931, Vol. 28, p. 961; 1932, Vol. 29, p. 850.] *H. H. S.*

WATANABE (Yoshimasa). **Experimental Studies on Animals concerning Leprosy, Report III. The Effect of Potassium Iodide on Animals inoculated with Leprosy.**—*Kitasato Arch. Experim. Med.* 1935. July. Vol. 12. No. 3. pp. 304–312.

The author reports that when rats are repeatedly inoculated with rat or human lepra tissue the former produces generalized rat leprosy, but the latter only a temporary bacillus-containing nodule at the site of the injection. The weekly injection of iodide of potassium in 0·05 gm. per 100 gm. body weight caused a temporary increase in the leprous lesions in both cases. *L. R.*

WATANABE (Yoshimasa). **Experimental Studies on Animals concerning Leprosy, Report IV. Allergy and Inoculation of Lepra Materials.** —*Kitasato Arch. Experim. Med.* 1935. Oct. Vol. 12. No. 4. pp. 355–361.

This worker finds that the inoculation of insusceptible rats with emulsions of human leprous nodules produces only a mild and temporary reaction in the form of a small localized nodule, but on repeated inoculations with the same strain the reaction becomes stronger and the nodules larger and more persistent. Further, when monkeys are inoculated with either human or rat leprous material the immediate reaction subsides in a day or two, but after an interval hard nodules appear at the site of inoculations. With repeated inoculations the initial reaction is not absorbed, but a hard nodule is formed, which may even go on to ulceration. The rat strain caused stronger reactions in monkeys than the human one. He concludes that an initial inoculation of leprous emulsions into white rats and monkeys causes a certain degree of subsequent allergy. *L. R.*

SOULE (M. H.). **The Relationship of Human Leprosy and Rat Leprosy. A Study of Wild Rats captured in the Culion Leper Colony.**—*Internat. Jl. Leprosy.* Manila. 1935. July–Sept. Vol. 3. No. 3. pp. 291–310. [30 refs.]

The possibility of infection of rats naturally with human leprosy has been examined in the very favourable conditions of the Culion Leper settlement with negative results, for 212 trapped rats showed not a single leprosy infection. Moreover, inoculations of abundant human lepra bacillus-containing tissue into 23 Culion rats, and 11 control rats on another island, all gave negative results. Although rats can readily be infected by the inoculation of small quantities of rat leprous material, all efforts to cultivate the organism failed. The author rejects the claim of Walker and Sweeney to have cultivated the organism of leprosy. *L. R.*

NAKAMURA (K.), KOBASHI (S.) & MATSUMOTO (I.). Inokulationsversuche der Menschenlepra auf Hausratten. II. Mitteilung. [**Inoculation of *R. norvegicus* with Human Leprous Material.**]—*Japanese Jl. Experim. Med.* 1935. Oct. 20. Vol. 13. No. 5. pp. 619–628. With 13 figs. (2 coloured) on 5 plates.

This paper deals with the inoculation of human leprous material into young house rats (*Rattus norvegicus norvegicus*) after the removal from them of the thyroid gland and the parathyroids. Of 34 rats so

treated 17 or 50 per cent. developed leprous lesions with a clear picture of granulation tissue in the skin, testicles and lymph-glands containing innumerable lepra bacilli and globi in the affected areas. This shows that their susceptibility was increased by the previous operation, for unoperated control animals did not contract the disease, although long continued efforts were made to infect them. Further tests were made in the case of healthy young white rats after removal of the thyroid gland with negative results, although it was easy to infect the house rats under similar conditions. *L. R.*

Wayson (N. E.) & Masunaga (Eichi). **Rat Leprosy. Observations concerning Transmission of the Infection through the Nose.**—*Public Health Rep.* 1935. Nov. 8. Vol. 50. No. 45. pp. 1576–1581. With 4 figs. on 2 plates.

This is an interesting inquiry into the natural modes of infection of rat leprosy. The author concludes: 1. Acid-fast bacilli have frequently been found in the noses of wild rats infected with leprosy-like disease of rats, and likewise in white rats experimentally infected by subcutaneous inoculation. 2. Normal white rats in prolonged direct or indirect contact with infected rats harboured acid-fast bacteria in the nose and developed the disease under the conditions of the experiments. 3. Rat leprosy has developed in white rats subsequent to the instillation of a suspension of rat lepromata into the nostril without trauma to the nasal mucous membrane. *L. R.*

Marchoux (E.), Chorine (V.) & Koechlin (D.). Infection lépreuse des rats par la voie oculaire. [**Lepra Infection of Rats *viâ* the Conjunctiva.**]—*Ann. Inst. Pasteur.* 1935. Dec. Vol. 55. No. 6. pp. 632–640. With 3 coloured figs. on 1 plate. [11 refs.]

In view of the frequency of nasal involvement in human leprosy, possibly through infection *viâ* the lachrymal duct, and of the demonstration by Calmette that laboratory animals can be infected through the conjunctiva with the acid-fast bacillus of tubercle, the authors have applied emulsions of rat lepromata to the conjunctiva of healthy rats and traced the penetration of the causative bacilli through the mucous membrane by diapedesis of leucocytes that have engulfed them. On killing the rats after 12 to 16 months no visible external leprous lesions were noted, but on careful microscopical examination it was found that, although the eye itself was not involved, the leprous organisms were found in the lymphoid tissue at the internal angle of the eyelids and in the lymphatic glands of the neck and even in those of the axilla. It therefore appears to be likely that in human leprosy any bacilli that may be deposited on the conjuctiva by a contaminated finger may gain access to the local lymphatics, but infection of the eye itself is not the result of a local infection; it is part of a generalization of the disease. *L. R.*

Lampe (P. H. J.) & de Moor (C. E.). Ratten-lepra. [**Rat Leprosy.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1935. Nov. 26. Vol. 75. No. 24. pp. 2033–2049. With 8 figs. on 2 plates. English summary.

Attempts at the experimental infection of 56 young white rats, either by percutaneous inunction of the skin of the belly after shaving

so as to cause slight bleeding, or by subcutaneous injection into the root of the tail of lymph node emulsions from naturally infected leprosy rats in Batavia are recorded, some of the animals being fed on a vitamin deficient diet, the animals being kept under observation for 1½ years. In rather over 90 per cent. infection occurred by either method, usually within four to ten months, with the occurrence of enormous number of the bacilli in the skin lesions, mostly intracellular. Lepromata resembling those of cutaneous leprosy in man not infrequently occurred at the site of inunction, and glandular involvement and ulceration might follow. Vitamin B_2 deficiency had some influence in aiding the development of the disease after percutaneous inunction with moderate doses. The virus appeared to behave more like a saprophyte than a parasite. *L. R.*

Tihon (L.) Contribution à l'étude des huiles chaulmoogriques indigènes du Congo Belge. [**Chaulmoogra Oils in Tree Indigenous to the Belgian Congo.**]—*Bull. Agric. Congo Belge.* 1935. Sept. Vol. 26. No. 3. pp. 315–321.

The various trees in different countries that yield oils containing chaulmoogric and hydnocarpic fatty acids belong to the family of Flacourtiaces. The author has studied those of the Belgian Congo and West Africa, namely *Oncoba glauca* or *Caloncoba glauca* and *Caloncoba Welwitschii*, and he gives analyses of *Caloncoba glauca*. This he states is superior to the others in richness in fatty acids possessing rotatory powers, the percentage amounting to 31·47 of the seeds. The fatty acids have a density at 26°C. of 0·940, a refractive index at 40°C. of 1·4765, an acid index of 3·25, a saponification index of 190, an ether index of 186·34, an iodine index of 98·10, a deviation of the polarimeter at 20°C. of 46·08 and a specific rotatory power of 49·02. The melting point is 54° to 56°C., the index of neutralization 204, and the mean molecular weight 275. He therefore concludes that this oil is a very promising one in the treatment of leprosy.

L. R.

de Mello (F.) & Loyola Pereira (O.). Les injections intraveineuses d'huile de chaulmoogra. [**Intravenous Chaulmoogra Oil in Leprosy.**]—*Bull. Soc. Path. Exot.* 1935. Oct. 9. Vol. 28. No. 8. pp. 700–701.

This very brief note records that 45 leprosy cases have been treated by about 1,000 intravenous injections of chaulmoogra oil by the method of Labernadie without accident except in one complicated by pulmonary tuberculosis. He thinks this plan more efficacious than other forms of administration. *L. R.*

Hueck (Otto). Ueber Lepra-Behandlung in der Canton-Provinz. [**The Treatment of Leprosy in Canton.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Nov. Vol. 39. No. 11. pp. 464–474.

The author reports the use of alepol and ester chaulmoogrates in leprosy cases in Canton with somewhat variable results. More physicians are required to tackle the problem effectively in that very leprous region. *L. R.*

Montel (M. L. R.) & Truong-van-Que. Un cas de lèpre généralisée (forme mixte) associée au paludisme et traitée uniquement par le bleu de méthylène combiné au rouge neutre de toluène en solution à 1/100. Observation et bilan après 7 mois 10 jours de traitement.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Feb.–Mar. Vol. 13. No. 2. pp. 58–71. With 2 figs.

—— & ——. Un cas de lèpre généralisée (forme mixte cutanéo-nerveuse et tuberculo-maculeuse) traité par le rouge neutre associé au bleu de méthylène. Observations et bilan après cinq mois de traitement. [**Cases of Mixed Leprosy treated with Methylene Blue and Neutral Red.**]—*Ibid.* pp. 72–78.

The first of these cases was a bacteriologically positive dermal one in which, after seven months' treatment with 25 injections in two series, containing a total of 5·55 gm. of methylene blue, and eight containing a total of 0·58 gm. of neutral red, lesions in the testicles cleared up with return of the sexual functions, as well as those of the skin, but as lepra bacilli could still be found in the dermis the treatment will be continued with the addition of chaulmoogra preparations.

The second case was originally negative bacteriologically but the dermal lesions completely disappeared under the same treatment.

L. R.

i. Truong-van-Que. Un cas d'infantilisme lépreux traité par la méthode de M. L. R. Montel. (Bleu de méthylène intraveineux.) Observation et bilan après cinq mois et onze jours de traitement. [**The Treatment of Leprosy by Dyes.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Apr. Vol. 13. No. 3. pp. 247–256. With 2 figs.

ii. Montel (M. L. R.), Le-van-Phung, Nguyen-van-Khai, Tran-van-Hanh, Do-van-Hoanh, Truong-van-Que & Nguyen-ngoc-Nhuan. Observations résumées de vingt cas de lèpre chez des jeunes. Traitement par le bleu de méthylène seul ou associé au chaulmoogra.—*Ibid.* May. No. 4. pp. 337–361. [24 refs.]

iii. de Raymond. Le traitement de la lèpre au Tonkin par les colorants.—*Ibid.* pp. 440–441.
de Fajole. Note thérapeutique sur le traitement de la lèpre par les colorants.—*Ibid.* p. 442.

iv. Vu-ngoc-Anh. Traitement de la lèpre par le bleu de méthylène et l'éosine à la léproserie de Vân-môn.—*Ibid.* pp. 443–451.

v. Dorolle (P.) & Ngo-quang-Ly. Résultats obtenus après quatorze mois d'expérience du traitement de la lèpre par les colorants. (Bleu de méthylène et eosine-bleu.)—*Ibid.* July–Aug. No. 6. pp. 675–706.

vi. Fréville (L. H.). Le traitement de la lèpre par la méthode de M. L. R. Montel. (Résultats après un an d'expérimentation.)—*Ibid.* pp. 707–718. [10 refs.]

vii. Dubois (A.). A propos du traitement de la lèpre au bleu de méthylène.—*Bull. Soc. Path. Exot.* 1935. July 10. Vol. 28. No. 7. pp. 550–551.

viii. Montel (R.). La chromothérapie de la lèpre. Etude générale.—*Ibid.* pp. 616–626. [43 refs.]

ix. ——. A propos de la communication de Mme. E. Delanoë "le bleu de méthylène compris dans le traitement mixte de la lèpre"

et de la discussion de cette communication.—*Ibid.* Oct. 9. No. 8. pp. 695–696.

x. —— & Tran-van-Hanh. Un cas de lèpre cutanée tuberculeuse généralisée récente traité par le bleu de méthylène. Blanchiment clinique et bactériologique.—*Ibid.* pp. 696–700.

i. This note records a case of leprosy in a girl of twenty, with infantile development, who improved greatly in her symptoms and development under methylene blue treatment for three months.

ii. Brief notes are given of twenty cases in children and adolescents treated by a combination of methylene blue intravenously and injections of chaulmoogra preparations. All the cases showed improvement, and in half the clinical symptoms were cleared up. In three-fourths the discharge of lepra bacilli from the nose ceased, and in half the organisms could no longer be found on microscopical examination of the lesions. In three cases relapse took place after one to six months, and in three pustules occurred in the course of treatment followed by improvement. In all the cases the size of the nerves was reduced.

iii. The very brief note by Raymond records that 99 patients had been treated since June 1934 with intravenous injections of methylene blue and other dyes, including eosin, fluoresceine and fuchsin, with unsatisfactory results, as apart from some temporary remission of symptoms, no clear manifestations of any curative action were observed. On giving up the use of the dyes and using hyposulphite of magnesium and chaulmoogra preparations more favourable local and general improvement was obtained.

Fajole also reports that methylene blue was without any specific effect.

iv. This paper reports on fifteen cases treated with 1 to 2 per cent. solutions of methylene blue and of eosin intravenously. Two of them showed definite benefit, and six more showed slight improvement. On the other hand in three cases the activity of the disease appeared to be increased even when temporary improvement had at first been noticed. There was no difference between the two dyes for with both improvement in the appetite and in the healing of ulcers was only momentary in all but two cases. This was not due to deficiency of dosage as Montel's method was strictly followed.

v. Fourteen months' experience of the dye treatment is recorded in this paper with short notes of 30 cases, including 1,313 intravenous injections, about half having been of methylene blue, without any ill results. For this purpose they use the following formulas of Peirier. A solution of 1 per cent. methylene blue RAL, neutralized (pH 7·4) and isotonic, filtered and sterilized by Tyndall's method. A solution of 2 per cent. eosin-blue (1·50 eosin RAL, 0·50 methylene blue RAL neutralized (pH 7·35), isotonic, filtered and sterilized by Tyndall's method. Of 55 lepers treated 17 did not continue the treatment sufficiently long, less than 18 injections, and 8 recent cases are also excluded from consideration for various reasons. They found no difference in the value of the two solutions, but prefer 2 per cent. eosin-blue, of which they injected totals of from about 500 to over 1,000 cc. in the course of 2 to 13 months. In 23 cases improvement was noted with complete clearing up of the lesions in 7, slight improvement in 9, moderate in 7, and very marked in 7. Nodules, ulcers and infiltrations were nearly always improved, but erythematous, tuberculoid and macular lesions were less influenced. Pains

and sleeplessness were relieved, as well as thickening of nerves and muscular atrophies causing deformities of the hands. Pustules, with elimination of the lepra bacilli, and reactions in the nerves were followed by benefit. On the other hand, very little action on the lepra bacilli was observed, for in only 2 of 18 cases did they disappear from the nose, and in no case from the cutaneous lesions. They advise combining the use of the slower action of chaulmoogra preparations with the more active action of the dyes.

vi. This author also advocates the combined use of Mercado's chaulmoogra formula with the dye treatment and he reports on 10 months' experience with very similar results to the above, but he remarks that it is too soon to speak of cures.

vii. The author reports the unsuccessful prolonged use of the dye treatment in full doses.

viii. In this note Montel summarizes the results he has obtained from the use of various dyes in leprosy. He commences by emphasizing that they do not replace the established value of chaulmoogra preparations as the basis of the treatment of the disease. Trypan blue he soon gave up on account of its injurious effects in producing albuminuria. Brilliant green he found to exert little beneficial action. Neutral red is also badly borne and causes fever, vomiting and toxic symptoms, but in doses not exceeding 10 to 12 cc. and beginning with only 2 to 3 cc. increased by 1 cc. at a time, it provokes reactivation of the lesions and renders methylene blue more effective. On the other hand, methylene blue can be continued for long without any harm, and it clearly reinforces the action of chaulmoogra treatment when given as described in previous papers. The methylene blue is more active than chaulmoogra, but the latter has a more lasting effect and protects more usually from relapses. The association of eosin and methylene blue as given by G. Ryrie is comparable with the latter alone. Fluoresceine-Uranine and resorceine are also of value.

ix. In this brief note Montel criticizes Delanoe's unfavourable report on methylene blue treatment on the grounds of insufficient treatment and of his omission to use chaulmoogra treatment as well.

x. This is a report of a case of generalized cutaneous leprosy completely cleared up, with disappearance of the lepra bacilli from the lesions and improvement in the nerve symptoms under methylene blue treatment. *L. R.*

Fernandez (José M. M.) & Schujman (Salomon). Nuestra experiencia acerca del valor de algunas anilinas en el tratamiento de la lepra. [**Experiences with Aniline Dyes in the Treatment of Leprosy.**]—*Rev. Leprologia de São Paulo.* 1935. Sept. Vol. 2. No. 3. pp. 157–168. [10 refs.]

The authors tested the following :—

1. *Trypan blue.* A 4 per cent. solution, filtered, sterilized and kept away from light, was used for 7 patients in an advanced stage of leprosy. Five cc. given intravenously was well tolerated by all; 4 days later 10 cc. of a fresh solution prepared 12 hours before were injected. All the patients felt ill, and complained of precordial and epigastric pain, nausea and shivering, but with one exception all recovered in 15 minutes. This patient who showed an intense leprous reaction passed almost at once into a state of coma and died in 5 minutes. No further trials were made with this preparation.

2. *Fluorescein*, a 2 per cent. solution in 2 per cent. bicarbonate of sodium solution, injected twice a week, starting with 5 cc., then 10 cc. and going gradually to 20 cc. without giving rise to any signs of intolerance. Thirty-two patients, mostly in an advanced stage, were thus treated, 29 had previously had chaulmoogra. Three patients with acute iritis seemed to benefit but no effect was observed in any of the others.

3. *Bonney's blue*, which is a mixture of brilliant green and crystal violet, of a strength of 0·5 gm. of each in 2½ litres. Fourteen were thus treated, starting with 3 cc. intramuscularly; this, however, caused abscesses and intradermal infiltration of 4 cc. was given twice a week, and a month later this was combined with intravenous injection of 10 cc. After 20 weeks' treatment, 2 had made a little improvement, 4 were worse and 8 remained stationary. All but one had previously received treatment with chaulmoogra.

4. *Eosin*, 2 per cent. solution injected intravenously twice a week in doses of 10 cc. was tried in 7 patients with the leprous reaction, but no improvement was observed in any of them.

5. *Methylene blue*, 1 per cent. aqueous solution injected intravenously in doses starting at 5 cc. and increasing to 20 cc., injection being given every 3 days. Fourteen patients were thus treated. No beneficial effect was observed regarding the general condition, or clinical or bacteriological manifestations. On the leprous reaction in four cases the condition became frankly worse, in three others there was no change.

In brief, these aniline dyes were inferior in action to chaulmoogra and its derivatives. *H. H. S.*

Montel (M. L. R.). A propos de trois communications sur le traitement de la lèpre par le bleu de méthylène (ce bulletin No. 4 mai 1935. T. XIII—P. 440 à 451).—*Bull. Soc. Méd.-Chirurg. Indochine.* 1935. Sept. Vol. 26. No. 7. pp. 793–797. (Discussion par le Docteur Dorolle pp. 797–798).

Nguyen-van-Tung. A propos du traitement de la lèpre par le bleu de méthylène.—*Ibid.* pp. 799–805.

Borzone (A.). El azul y el rojo de metileno, en el tratamiento ecléctico de leprosos.—*Rev. Méd. Peruana.* 1935. Nov. Vol. 7. No. 83. pp. 875–878.

Sorley (J. T.). **The Use of Brilliant Green intravenously in the Treatment of Leprosy.**—*West African Med. Jl.* 1934. Oct. Vol. 8. No. 2. pp. 13–14.

A trial of 1 per cent. brilliant green intravenously in the small doses of 3 to 5 cc. twice a week produced albuminuria and jaundice in some cases, but considerable clinical improvement was noted in cases previously on alepol. *L. R.*

Braga (Renato). Tratamento da lepra pelo azul de methyleno. [**Treatment of Leprosy by Methylene Blue.**]—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 7–32.

An interesting paper giving details of 63 patients with different forms of leprosy and stages and combinations of them treated with injections of 1 per cent. methylene blue in distilled water. The opinion

gained from these is temperately expressed. Injections were given intravenously in increasing doses at 3–4 day intervals. Many of the patients were in an advanced stage; some were quite intolerant of chaulmoogra and its derivatives, but after a course of the dye were enabled to take the specific drug. It may be that the methylene blue serves as a vector for other antilepra remedies (MONTEL recommends it being given with chaulmoogra), bringing about a state which leads to a better or more intense action of these others. At all events, whatever be its mode of action, the author maintains that though he has not used the dye in sufficient cases to venture an opinion on its merits in general, nevertheless the good effects observed in some of them warrant further trial. *H. H. S.*

MAURANO (Flavio). Os resultados do tratamento pelo azul de metileno endovenoso. Segundo a technica de Montel sob o ponto de vista dermatologico. [**Methylene Blue Intravenously in Leprosy.**]—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 33–37.

Dr. Maurano expresses an opinion markedly at variance with the above. He is particularly concerned with the skin lesions due to or associated with leprosy. Forty-four patients in all stages of the disease were given injections of methylene according to Montel's technique; he concluded that only one improved, while in seven the general state was worse and in another 11 the skin lesions were aggravated. In the author's view, not only is it "without efficacy, but is even harmful. In 25 per cent. of the patients, the skin lesions were worse after its use, and in 18 per cent. the general condition was aggravated; all the rest, with one exception, were unaffected."

Twenty-six of the 44 presented the leprous reaction; only one patient benefited from the methylene blue; five showed an increase, in four it was reduced. *H. H. S.*

DE CARVALHO (J. Correa). Tratamento da lepra pelo azul de methyleno no asylo-colonia Aymorés. [**Methylene Blue in Leprosy. Results at the Aymorés Leper Colony.**]—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 38–43.

Notes are given of 16 cases, one nodular, the rest mixed, treated by Montel's method. Of these, 4 were worse, 3 slightly improved and 9 showed distinct amelioration. The author gives a summary, without individual details, of 51 cases, 43 with mixed, 8 with the nervous form of the disease. The results varied considerably; in 14 he noticed retrogression of lepromata, but in three it seemed to provoke ulceration. He concludes that it merits use as an adjuvant. *H. H. S.*

VALENTE (Edison Costa) & BECHELLI (Luiz Marino). O azul de methyleno no tratamento das reacções leprosas. [**Methylene Blue in Treatment of the Leprous Reaction.**]—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 44–53.

Thirty-seven patients, 13 with the nodular form and 24 with mixed leprosy, received the methylene blue treatment for the leprous reaction. Note is given of each, but the results may be summed up by saying that 6 were cured, 5 much relieved, 2 slightly improved, 9 were worse and the remaining 15 were not affected. The doses given were small

(to 20 cc.), average (20–25 cc.) and high (more than 25 cc.). Of those cured 3 had high, 2 average, and 1 small doses; of those much improved 3, 1 and 1 respectively; of those made worse 4 had large, 1 average and 4 small doses. In short, administration of the dye was followed by marked benefit in 11 and some benefit in 13 of the 37 cases, and generally better results were obtained from the use of doses exceeding 25 cc. *H. H. S.*

Bechelli (Luiz Marino). O azul de methyleno no tratamento das algias leprosas. [**Methylene Blue in the Neuralgias of Leprosy.**] —*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 54–67.

Fifteen patients with mixed leprosy and suffering from neuralgic pains were treated by injections of methylene blue. The author speaks of the results in terms of high praise. In one only did it fail to give relief. In eight the smaller doses sufficed, six had the large doses; intermediate doses did some good to four of the latter, but the larger doses gave greater benefit. Some exhibited untoward symptoms such as vertigo, ptyalism, shivering attacks; in six it seemed to precipitate the leprous reaction, but in four the eruption was vastly improved after the injections. *H. H. S.*

Arantes (Francisco Ribeiro). Acidentes observados no tratamento da lepra pelo azul de metileno. (Método de Montel.) [**Ill-Effects observed in Lepers treated by Montel's Methylene Blue Method.**] —*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 68–74.

The author's opinion is based on a comparatively small number of cases (50). He found that methylene blue injections had an ameliorating effect on the acute febrile attacks, but only transiently. It proved beneficial in about half his patients suffering from pain, neuralgic or neuritic, not only relieving the pain but giving longer periods of freedom. On the other hand it may precipitate a leprous reaction in patients hitherto free from this. The drug is not harmless, is not well eliminated and may set up a toxic hepatitis associated with diarrhoea, and " it may prove fatal by causing atrophy of the liver "; two patients died. The author concludes, therefore, that " methylene blue in the doses recommended by Montel is toxic and fraught with danger." *H. H. S.*

Junior (João de Moraes). Tratamento das algias em doentes de lepra. [**Treatment of Pains in Leprosy.**]—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 75–90.

The author has treated 30 lepers suffering from the mixed form with pain in nerves and joints by means of Crotalus anavenin. Seven of these had had various other methods of treatment without obtaining relief and of these detailed notes are given. The usual procedure was to wait for 8 days after the last form of treatment and then begin with the anavenin, injecting subcutaneously daily in or near the painful region. In one patient with the pain very persistent two injections were given in a day. In 14 of the total 30 the results were recorded as excellent, another 14 were considerably relieved, and there were only two failures. The dose was 0·1 mgm. and in many the pain disappeared after 6–8 injections, but usually a course of 8–10 was

given. The relief seems to have been prolonged; when seen 1–3 months afterwards the patients were still free. Others who had a slight return received further injections with benefit. *H. H. S.*

Nocht (Bernard) & Velasco (Felix). **Some Experiences in the Treatment of Leprosy by Artificially Induced Fevers: Preliminary Report.**—*Jl. Philippine Islands Med. Assoc.* 1935. Nov. Vol. 15. No. 11. pp. 602–609.

The authors were led to try the drugs now being used to produce fever in the treatment of G.P.I. by reports of improvement after attacks of kala azar, smallpox and protein shock. Pyrifer, sulfosin and anaesthesulf have been used, but only the first to any material extent because the patients refused to continue with sulfosin on account of the severe pains it induced, and this was also a drawback with anaesthesulf beginning some hours after the injection, in addition to which bronchial irritation was sometimes caused by both of them. Pyrifer was, however, given to six cases, in three or four series of 10 injections each, without after ill-effects, except chills and headache, and the high fever of from eight to ten hours up to 104°F. was well borne. Leucocytosis and prolongation of the sedimentation time were observed during the fever. Only one patient showed any marked improvement, and he differed from the rest in showing very strong febrile reactions after small doses from the first. Further trials are being made. Pyrifer is a sterilized suspension of a non-pathogenic bacillus of the *coli* group in 7 different strengths containing from 50 to 5,000 units, by means of which graduated febrile reactions can be obtained. *L. R.*

Basu (N. K.). Diets in Relation to Diseases with Special Reference to Tuberculosis and Leprosy.—*Jl. Indian Med. Assoc.* 1935. Oct. Vol. 5. No. 1. pp. 8–9.

Athavale (V. B.). Myiasis and Leprosy.—*Jl. Indian Med. Assoc.* 1935. Oct. Vol. 5. No. 1. pp. 10–12.

de Abreu (Manoel). Tratamento anti-leprótico em Santo Angelo e seus resultados.—*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 115–151.

Lima (Lauro de Souza). Metodo de infiltração intradermica ou "plancha." —*Rev. Leprologia de São Paulo.* 1935. Num. especial. pp. 167–173.

Huizenga (Lee S.). Human Sterilization and its Application in Leprosy.—*Jl. Philippine Islands Med. Assoc.* 1934. Dec. Vol. 14. No. 12. pp. 469–476.

RABIES.

A REVIEW OF RECENT ARTICLES. XXIV.*

i. *Virus.*

In a paper published in 1932, REPETTO (this *Bulletin*, 1933, Vol. 30, p. 141) drew attention to the existence of foci of rabies in the lower Congo. These were at Kasai, at Coquilhatville, at Kivu, at Kwango and in the Bas-Uélé. The symptoms were of the *oulou-fato* type. MATTLET[1] has discovered another focus at the Urundi. It has been periodically discovered in this locality, and "one can conclude that the Urundi constitutes a permanent focus of the oulou-fato type of rabies."

A report on rabies in cattle and horses in Santa Catharina (Brazil) is presented by de Freitas LIMA.[2] This subject has frequently been referred to in these reviews, in particular in summarizing the work of de Queiroz LIMA (this *Bulletin*, 1934, Vol. 31, p. 637) of TORRES (1932, Vol. 29, p. 596) and of HURST and PAWAN (1932, Vol. 29, p. 595). The author of the present article contributes no new facts, and is guarded as to the mode of transmission of the epizootic in nature.

REMLINGER and BAILLY[3] in an article commemorating the 50th anniversary of the application of Pasteurian treatment to man, describe the procedure to be adopted in examining a strain of fixed virus. This includes the study of the symptoms in the rabbit, the behaviour of the virus to desiccation, to glycerine, to dilution, to ether and to antiseptics, and finally the determination of its immunizing power. They stress the fact that neither the virus of Bucarest in its 2,582nd passage, nor the virus of Tangier in its 1,550th passage shows any indication of having lost immunizing power.

The comparative efficiency of immersion in glycerine and of freezing for the preservation of virulence has been examined by LÉPINE.[4] He points out that the usual practice of preserving in glycerine has the recognized disadvantage that that substance is a mild antiseptic. He has shown that undried medulla gradually loses virulence when kept in 30 per cent. glycerine at 0°C., until between the 14th and the 30th day it has completely disappeared, whilst the virulence of frozen medullae remained intact up to the 70th day.

It is well known (HARVEY and MCKENDRICK, Scientific Memoirs, Govt. of India No. 30, 1907) that when cords dried over various periods are tested for infectivity, the most marked effect is a reduction in the percentage infected. There may be some delay in incubation

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* For the twenty-third of this series see 1935, Vol. 32, p. 605.

[1] MATTLET (G.). Contribution à l'étude de la répartition des foyers de rage canine au Congo Belge.—*Ann. Soc. Belge de Méd. Trop.* 1935. June 30. Vol. 15. No. 2. pp. 221–223.

[2] LIMA (C. de Freitas). A raiva em Santa Catharina.—*Rev. Depart. Nac. da Producção Animal.* Rio de Janeiro. 1935. Vol. 1. Nos. 5 & 6. pp. 41–59. With 9 figs. [28 refs.] English summary.

[3] REMLINGER (P.) & BAILLY (J.). Comment procéder à l'expertise d'un virus rabique fixe?—*Bull. Inst. Pasteur.* 1935. July 15. Vol. 33. No. 13. pp. 609–617.

[4] LÉPINE (Pierre). Action comparée de l'immersion en glycérine et de la congélation sur la conservation de la virulence des moelles rabiques.—*C. R. Acad. Sci.* 1935. July 8. Vol. 201. No. 2. pp. 172–174.

but this is not so obvious. This was ascribed by the above authors to the centripetal effects of the drying of the cord from without inwards. Lépine and Cruveilhier[5] ascribe the phenomenon to the loss by desiccation of the virus of its faculty to travel along nerves (neuroprobasie). They state that if a heavy emulsion of a fresh cord is inoculated into a cut sciatic nerve, infection takes place 8 out of 9 times, whereas if the emulsion is one of a cord dried even for 24 hours infection never follows (24 guineapigs inoculated). [This observation clearly requires to be confirmed.]

It will be remembered that Nicolau and Kopciowska succeeded in retransforming fixed virus into street virus by subpassage by way of the sciatic nerve (this *Bulletin*, 1934, Vol. 31, p. 637 and 1935, Vol. 32, p. 605). Kopciowska[6] now investigates the behaviour of the retransformed fixed virus when inoculated into the dog. He finds that Negri bodies are present in large numbers (up to 98 bodies per 100 neurones). Intense negrigenesis and " septinévrite " are the attributes which characterize the retransformed virus.

Funayama[7] reports an ingenious experiment in which the filtrability of the virus of rabies is tested *within* the animal body. Small filters (either porcelain bougies or celloidin sacs) containing virus emulsion are introduced into the lateral ventricles of rabbits and left *in situ*. The test was of course whether the rabbit developed hydrophobia. Using Chamberland L_1 bougies 2 out of 13 were infected, with L_3, 3 out of 19, with L_9, 4 out of 21. With celloidin sacs 30 out of 54 were infected. Various strains of fixed and street virus were used but there seemed to be no difference in their filtrability.

A thorough and painstaking though fruitless research has been carried out by Waldhecker.[8] He has tried by various methods to cultivate the rabies virus and has not succeeded. He has tried to cultivate it in symbiosis with 10 different yeasts, with 2 strains of *Staph. albus*, and with the same organisms on egg medium. He has tried cultivation on the chorion-allantois of the hen embryo, in cultures with embryonic tissue, anaerobically in conjunction with mouse carcinoma, on a Chinese egg medium, and *in vivo* in a growing mouse carcinoma. The results have all been negative.

On the other hand Isabolinski, Lewzow and Tschernjak[9] claim to have cultivated the virus in symbiosis with yeasts. To a 10 cc. tube of bouillon to which a loopful of yeast culture has been added, 0·1 cc. of a 1 in 20 emulsion of the brain of a rabbit which died of

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[5] Lépine (P.) & Cruveilhier (L.). Action de la dessiccation sur la neuroprobasie du virus rabique.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 27. pp. 1338–1340.

[6] Kopciowska (L.). Sur le virus rabique fixe pastorien " ramené en arrière " (transformé apparemment en virus des rues après passages répétés dans le système nerveux périphérique du lapin).—*C. R. Soc. Biol.* 1935. Vol. 199. No. 19. pp. 405–408. With 1 fig.

[7] Funayama (Junichi). Experimental Studies on Rabies. II. A Test of the Filtration of the Hydrophobic Virus in Animal Bodies—*Oriental Jl. Dis. Infants.* 1935. May. Vol. 17. No. 3. [In Japanese. English summary pp. 21–24. With 5 figs. (2 on 1 plate).]

[8] Waldhecker (Max). Versuche zur Züchtung des Lyssavirus.—*Zent. f. Bakt.* I. Abt. Orig. 1935. Nov. 15. Vol. 135. No. 4/5. pp. 259–262.

[9] Isabolinski (M.), Lewzow (I.) & Tschernjak (I.). Ueber die Züchtung des Pocken und des Lyssavirus auf Hefenährboden.—*Giorn. di Batteriol. e Immunol.* 1935. Jan. Vol. 14. No. 1. pp. 111–116. English summary (5 lines).

rabies is introduced. This is incubated at 37°C. for 3 days, and then reinoculated in the same proportions into another yeast bouillon tube. As controls, similar passages are made into tubes to which yeast has not been added. Rabbits are inoculated from time to time with 0·2 cc. intradurally. The yeast mixtures were infective up to the 11th generation, whilst the controls were non-infective. It was also found possible to use yeast agar in place of yeast bouillon.

An experiment of a curious nature has been carried out by Bozzelli.[10] A mixture of equal parts of fixed virus and street virus was inoculated into groups of guineapigs, rabbits, and dogs, in four different positions, *viz.*: subdural, anterior chamber of eye, muscles of neck, and intramuscularly into a limb. In each group there were five animals, and two controls, one for street virus alone, and the other for fixed virus alone. The virus which caused death was determined in each case, from the incubation period, and by its behaviour on subpassage. The results may be summarized as follows:—

		Fixed Virus	Street Virus
Subdural:—	Guineapigs ...	5	0
	Rabbits ...	4	1
	Dogs	3	2
Ant. Chamber:—	G.P.	5	0
	Rabbits ...	5	0
	Dogs	1	4
Muscles of Neck:—	G.P.	3	2
	Rabbits ...	2	2 (1 escape)
	Dogs	1	4
Muscles of Limb:—	G.P.	0	5
	Rabbits ...	0	4 (1 escape)
	Dogs	0	4 (1 escape)

The two controls for the first 3 positions gave satisfactory incubations. In the case of those inoculated into the muscles of the limb the fixed virus control in guineapigs had an incubation period of 22 days, whilst in rabbits and in dogs it failed to infect: the incubations with street virus were 12, 13, and 14 days respectively.

The net results of this experiment would appear to be that fixed virus, as was to be expected, was the "winner" where the mixture was inoculated into nervous tissue directly, and gave place to street virus when inoculation was into muscles: and that the guineapig was the most susceptible to fixed virus, the rabbit rather less, and the dog the least susceptible.

That certain strains of fixed virus, such as the Tunis strain, have the potentiality in undue degree of producing Negri bodies is shown by Levaditi and Schoen.[11] Three strains of fixed virus were com-

[10] Bozzelli (Roberto). Studio comparativo sul comportamento della cavia, del coniglio e del cane, trattati con inoculazioni simultanee di virus rabbico fisso e di strada. Ricerche sperimentali.—*Giorn. di Batteriol. e. Immunol.* 1935. Feb. Vol. 14. No. 2. pp. 281–304. [47 refs.] English summary (9 lines).

[11] Levaditi (C.) & Schoen (R.). Le potentiel negrigène des virus rabiques fixes.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 23. pp. 811–815. With 2 figs.

pared. In the Paris strain the bodies were very small, and few showed inner structure; they were absent in the dog and excessively rare in the rabbit and mouse. In the Tangier strain, the bodies were rare, sometimes had inner structure, were found in the horn of Ammon of the dog, were absent in the rabbit, and were very rare in the mouse. In the case of the Tunis strain bodies were found in the rabbit in the horn of Ammon though in reduced numbers. They were absent in the dog, but frequent in the mouse.

Levaditi and Schoen[12] have further investigated the oxyphil corpuscles analogous to Negri bodies which are found in the cytoplasm of the corneal epithelium, in animals inoculated with street virus (this *Bulletin*, 1934, Vol. 31, p. 145). It appears that three strains of street virus, Bucarest II, Tangier IV and Tangier III did not behave identically. The strain Bucarest II gave rise to the largest number of Negri bodies in the brain and also in the corneal epithelium. Oxyphil bodies were more numerous in the cornea which had been the focus of infection than in that of the other eye, but on the other hand the virulence of the non-inoculated cornea seemed to be the higher. There appears to be no direct or constant correlation between the concentration of Negri bodies in a cornea, and its virulence.

In a third paper[13] these authors compare the evolution of the rabies virus with that of the vaccinial virus (Guarnieri bodies) in the cornea epithelium. The main distinction is that whilst the Guarnieri bodies appear only in the cornea which has been infected, in the case of rabies oxyphil corpuscles are often found in the two corneae at the same time. The authors consider that this proves that the vaccine virus remains local, whilst the virus of rabies first invades the central nervous system, and then travels along the 5th nerve to the cornea centrifugally.

In an article of 29 pages Shortt[14] discusses the question of nature of the Negri body. After a résumé of the literature on the subject, he describes fully the appearances which he has observed in tissues stained by Mann's stain and by iron haematoxylin. The material which he has employed is mainly the brain of the dog, and in this he has examined the appearances at all stages of development of the disease. Series of dogs were infected, and individuals were sacrificed at intervals throughout the course of infection. Some correlation was found between number and size of Negri bodies and the duration of clinical symptoms, and it appeared that the salivary glands may be infective before the onset of symptoms. The location, size and shape of the Negri bodies are then described, with numerous illustrations. Their internal structure is then dealt with. In a final discussion the author finds no evidence that the bodies are the products of nuclear or nucleolar degeneration. The theory that they are parasitic protozoa "while it cannot be dismissed, has no indubitable facts to support it."

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[12] Levaditi (C.) & Schoen (R.). Les corpuscules oxyphiles cornéens en rapport avec les diverses souches de virus rabique des rues.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 20. pp. 463–466.

[13] Levaditi (C.) & Schoen (R.). Evolution du virus vaccinal et du virus rabique des rues dans l'épithélium cornéen.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 22. pp. 706–709. With 4 figs.

[14] Shortt (H. E.). Morphological Studies on Rabies. Part II. Negri Bodies in the *Hippocampus major* in Street Virus Infections.—*Indian Jl. Med. Res.* 1935. Oct. Vol. 23. No. 2. pp. 407–436. With 58 figs. on 3 plates & 1 text fig. [34 refs.]

The theory that the bodies are the cell inclusions of a virus disease remains in the author's judgment unproven. The structure of the bodies is uniform, and " is the same in whatever animal it is studied, and the bodies have all the morphological characteristics of organized entities rather than those of mere agglomerations of elementary bodies such as the orthodox inclusion bodies are presumed to be." As none of the usual theories appears to have been established the author " submits for consideration, that on morphological grounds alone, the possibility should be considered that the Negri body is a vegetable organism structurally most closely approaching the yeasts." The author has kindly furnished us with sections showing the appearances which he describes.

Ramon y Cajal and Gracia (Trabajos del Laborat. de Investig. biol., Vol. 3, 1904) showed that in rabies (both fixed and street) the neurofibrils of the nerve cells are hypertrophied and fuse to form filaments. These observations are confirmed by Manouélian,[15] who considers that these appearances are indications of degeneration. The neurofibrils increase and fuse until finally they coalesce into homogeneous masses.

In an article of over 30 pages Lourens[16] summarizes our knowledge regarding the pseudorabies of Aujeszky. A report is also included of the discussion on the subject at the 9th session of the " Office international des Epizooties," Paris (1935), at which a resolution affirming the necessity for the collection of further information regarding the disease and for further experimentation on the action of the virus was passed.

It appears that pseudorabies can be communicated by dropping 0·2 cc. of a 1 in 50 emulsion of fresh brain substance from a rabbit dead of the disease into the external ear. The interest of this observation of Remlinger and Bailly[17] is that this is an ectodermal route similar to that of the skin.

The mode of transmission of Aujeszky's pseudorabies has been the subject of much recent discussion. Gerlach and Schweinburg[18] now report that they have observed " a spontaneous transference of the disease from a sick animal to a healthy unwounded animal," that the disease can be communicated by the bite, and that the saliva of a sick cow was infective to rabbits and guineapigs (*cf.* Remlinger and Bailly this *Bulletin*, 1933, Vol. 30, p. 578). The disease is described as it occurs in the dog, cat, horse, in cattle, pigs, rabbits, mice and guineapigs. The differential diagnosis from rabies is difficult. Negri bodies indicate rabies but they are not always found. A clinical diagnosis is, according to the authors, not possible. A second communication will deal with serological reactions and crossed immunity tests.

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[15] Manouélian (Y.). Altérations massives du réseau neurofibrillaire dans la rage. Dégénérescence neuro-hyaline des cellules nerveuses des ganglions cérébro-spinaux.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 25. pp. 1021–1023. With 4 figs.

[16] Lourens (L. F. D. E.). Ziekte van Aujeszky.—*Tijdschr v. Diergeneesk.* 1935. Sept. 1 & 15. Vol. 62. Nos. 17 & 18. pp. 885–902 ; 949–964. [3 pages of refs.] English summary.

[17] Remlinger (P.) & Bailly (J.). Transmission de la maladie d'Aujeszky au lapin par voie auriculaire.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 24. pp. 937–939.

[18] Gerlach (F.) & Schweinburg (F.). Experimentelle Untersuchungen ueber die Aujeszkysche Krankheit (Pseudowut). I. Mitteilung.—*Wien. Klin. Woch.* 1935. Nov. 8. Vol. 48. No. 45. pp. 1379–1382.

The mode of transmission of pseudorabies in cattle is also discussed by SHOPE.[19] There is no evidence, he says, that the disease is contagious or that ectoparasites play a part in transmitting the causative virus The morbidity rate in herds does not usually exceed 10 per cent. Experiments with pseudorabies in swine have supplied information suggesting that the disease in this species may be of epidemiological importance in the spread of the infection to cattle. In the pig the disease is relatively mild, but highly contagious. The nose serves both as an entrance and as an exit for the virus. Contact between the abraded skin of rabbits and the nose of infected swine induces infection. In certain cases which SHOPE has examined it is believed that swine which harboured a mild and unrecognized pseudorabies infection transmitted the disease to the cattle with which they were associated, by the transfer of the virus on their noses to the abraded skin of the cattle.

In a second section of this communication SHOPE shows by examination of the blood sera, that the disease is highly prevalent in middle western hogs. Rats may also play a part. When infected they rapidly develop a fatal infection. They may serve as the initial source of infection of a herd of swine and also as one means by which the virus can be spread from farm to farm.

ii. *Symptomatology and Diagnosis.*

IYENGAR[20] reports a case in which the incubation period is stated to be 1,180 days. He believes that the possibility of a fresh infection during the interval has been excluded.

An interesting case is described by GENEVRAY and DODERO.[21] A pregnant woman showing symptoms of rabies was submitted to a Caesarean operation, and died of typical rabies some hours after. The diagnosis of rabies was confirmed histologically and by animal experiment. The child remains well and is 13 months old. It would thus appear that the virus had not traversed the placenta, or if so, in too small quantity to transmit the disease. The serum of the child was tested at the age of 8 months, and no rabicidal substances were demonstrable.

LÉPINE[22] recommends for the staining of Negri bodies, a mixture of two solutions: A, 1 gm. basic fuchsine in 200 cc. of 50 per cent. alcohol; B, an aqueous solution of safranine 1 per cent. Paraffin sections after treatment with xylol and alcohol are stained for 10 minutes with equal parts of the above solutions. They are decolourized

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[19] SHOPE (Richard E.). Experiments on the Epidemiology of Pseudorabies. I. Mode of Transmission of the Disease in Swine and their Possible Rôle in its Spread to Cattle. II. Prevalence of the Disease among Middle Western Swine and the Possible Rôle of Rats in Herd-to-Herd Infections. —*Jl. Experim. Med.* 1935. July 1. Vol. 62. No. 1. pp. 85–99. [15 refs.]; 101–117. [10 refs.]

[20] IYENGAR (K. R. K.). A Case of Hydrophobia with the Longest Incubation Period on Record.—*Indian Med. Gaz.* 1935. Oct. Vol. 70. No. 10. p. 562.

[21] GENEVRAY (J.) & DODERO (J.). Note sur un enfant né d'une mère en état de rage.—*Ann. Inst. Pasteur.* 1935. July. Vol. 55. No. 1. pp. 124–127. [14 refs.]

[22] LÉPINE (P.). Méthode de coloration histologique du névraxe pour l'étude cytologique de la rage et des maladies à virus, (inclusions nucléaires et inclusions protoplasmiques).—*C. R. Soc. Biol.* 1935. Vol. 119. No. 23. pp. 804–805.

in alcohol acetone and washed, then coloured for ½ to 1 minute with Stévenel's permanganate blue solution, undiluted (*Bull. Soc. Path. Exot.*, 1918, Vol. 11, p. 870) washed in running water to eliminate excess of blue, again destained in alcohol acetone, then dehydrated in 95 per cent. alcohol : xylol : balsam. The tissues in relation to inclusions in general are coloured as follows : Stroma pale rose, neuroglia and leucocytes violet, neurones blue, chromatin purple, nuclei bright red, nuclear inclusions and oxyphil substances bright rose, Negri bodies rose-mauve, internal structures lilac.

This method of staining has been compared with that of Giemsa by NICOLAU and BAFFET.[23] In a series of four experiments the numbers of Negri bodies found in sections stained by LÉPINE's method were 2·4, 3·6, 4·3, and 5·7 times as great as those found in sections stained by Giemsa.

A rapid method for demonstrating Negri bodies in urgent cases is given by FRYER.[24] Small pieces of hippocampus ⅛th inch thick in hot (60°C.) formol saline for 15 minutes. Dehydrate in abs. alc. 10 minutes, then in a mixture of acetone and ether (equal parts) for 10 minutes. Clear in cedar wood oil at 60°C. Two changes paraffin wax, 10 minutes in each at 60°C. ; embed and cut. Mount on albuminized slides, fix gently over the Bunsen flame. Remove paraffin with xylol, then alc., wash carefully in aq. dest. Pour on equal parts of hot 1 per cent. aqueous methylene blue, and 1 per cent. eosin for about 15 minutes according to thickness of section. Wash with aq. dist., flood section for 10 seconds with formalin (40 per cent.) wash with water. Differentiate with alkaline alcohol (30 cc. abs. alc. with 8 drops of 1 per cent. sod. hyd.) rapid alcohol till blue, clear with xylol and mount. Negri bodies stain red. The whole process can usually be completed in 1½ to 2 hours. Naturally histological detail is not good, but Negri bodies are well defined, and stand out prominently.

iii. *Pathology.*

The lesions of the neurones in fixed virus rabies have been studied by LÉPINE and SAUTTER.[25] (1) Negri bodies are rarely found, and if present are very small and have no inner structure. (2) Nuclear lesions in the form of hyperchromatic corpuscles, round or oval, more or less numerous in the same cell, appear in the interior of a uniformly oxyphil nucleus from which all traces of chromatin have disappeared. (3) Fine intra-protoplasmic inclusions, granular or elongated of the type described by MANOUÉLIAN are frequently seen. These effects are seen in sections stained by LÉPINE's method.

iv. *Methods of Treatment and Statistics.*

For the last six years a standard method of antirabic treatment has been employed at the institutes of Jugoslavia. The phenol-ether vaccine of Hempt is used. The results of this experience are the

[23] NICOLAU (S.) & BAFFET (O.). La coloration de lépine dans la recherche des corps de Negri.—*C. R. Soc. Biol.* 1935. Vol. 120. No. 31. pp. 319–322.

[24] FRYER (S. V.). A Rapid Method of Diagnosis of Rabies in Urgent Cases.—*West African Med. Jl.* 1934. Oct. Vol. 8. No. 2. pp. 15–16.

[25] LÉPINE (P.) & SAUTTER (V.). Sur les lésions spécifiques des neurones dans la rage à virus fixe.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 23. pp. 805–807.

subject of a comprehensive article by NIKOLIĆ,[26] superintendent of the institute at Novi-Sad. In the first place the technique of preparation of the vaccine is described, and adequately illustrated. The apparatus for filling capsules in such a manner that both sedimentation and frothing of the emulsion are avoided, is particularly interesting and should be studied by those who are concerned with the distribution of vaccine on a large scale. The second section is statistical. It relates precisely to the same set of statistics as has been classified in my reviews for the League of Nations under the heading "killed ether vaccines," and which have already been referred to in these reviews. The extraordinary immunity of persons bitten on the leg in Jugoslavia (no deaths amongst 8,869 persons bitten), is passed without remark. An interesting series of rabbit experiments in which treatment by Hempt's method is compared with no treatment, yields the following result: Of 346 rabbits which received a preinfectional treatment of 10–25 cc. of vaccine over a period of from 3–4 days, 99 died from intercurrent disease, 19 of rabies, and 228 survived (*i.e.*, percentage of survivors 92·4, and of those dead of rabies 7·6), whereas of 96 controls, 12 died otherwise, 73 of rabies, and 11 survived (*i.e.*, percentages of 13·1 and 86·9 per cent. for survivors and those dead of rabies, respectively). The result of postinfectional treatment was, as was to be expected, not so satisfactory. Of 40 treated from 6–21 days with 1·5 gm. of brain substance, 32 died of rabies (*i.e.*, 80 per cent.), whilst of 14 controls, 2 died of intercurrent disease, and 12 of rabies (*i.e.*, 100 per cent.). The same success was observed in animals treated by dilutions according to the method of Högyes. NIKOLIĆ rightly ascribes the failure of post-infectional immunization experiments to the shortness of the incubation period in experimental rabies.

An interesting set of figures, illustrated by a graph, shows the effect of treatment upon the incubation period in human cases. Of 62 fatal cases treated during the period 1927–1934, 49 (79 per cent.) had incubation periods of under 40 days, and 13 (20·9 per cent.) incubations of over 40 days. Of 53 untreated persons who died during the same period, exact information was available in the case of 28 of them. Of these latter, 4 (14·2 per cent.) incubated in less than 40 days, whilst 24 (85·8 per cent.) had incubations of over 40 days. This result is interesting in relation to VAN STOCKUM's figures (this *Bulletin*, 1935, Vol. 32, pp. 612–616). The author then goes on to discuss 4 cases of post-vaccinal paralysis which occurred amongst the 53,780 persons treated during the six years. The whole question of the causation of accidents is discussed, and the author stresses the possibility of another neurotropic virus being transmitted to the bitten person through the scratch or bite. Finally the question of decentralization of treatment is discussed.

The effect of preinfectional treatment by powerful antirabic sera upon the development of the disease in mice has been studied by HOYT, FISK, and MOORE.[27] The sera had a titre of 1/256, and the

[26] NIKOLIĆ (Milan). Ueber die resultate der Dezentralisation der Tollwutbekämpfung in Jugoslawien. Auf Grund 6 jähriger Erfahrungen mit der versendbaren phenolisierten Aethervakzine und der abgekurzten Impfmethode nach Hempt.—*Vet. Arhiv.* 1935. Vol. 5. Nos. 6 & 7. pp. 247–288; 289–320. With 5 figs. [30 refs.]

[27] HOYT (Anson), FISK (Roy T.) & MOORE (Frederick J.). Experimental Rabies in White Mice. Studies on Passive Immunization I.—*Proc. Soc. Experim. Biol. & Med.* 1935. June. Vol. 32. No. 9. pp. 1560–1561.

infecting dose was 0·2 cc. of a filtered emulsion. The sera were injected intraperitoneally from 48 to 1 hour before administration of the test dose. Control mice were given normal serum. It was found that a higher number of treated mice (39 per cent.) survived than of the corresponding controls (12 per cent.). A longer mean incubation period was shown by the treated than by the untreated. The number of mice in the treated group was 155, and in the untreated it was 198. It is stated that the data have been submitted to a careful statistical analysis by Dr. Thurston H. Ross, but no details are given.

The statistics of the Pasteur Institute at Paris for the year 1934 are published by Viala.[28] 496 persons were treated, none developed rabies, and no paralytic sequelae were observed. The strain of fixed virus employed is that which has been in use since 1888. The number of the passage is not given. The mortality during the 33 years up to 1921 ranged from 0·20 to 0·35 per cent. Since 1922 (except for one case in 1924) it has been 0 per cent. It is pointed out that in 1921 the maximum duration of desiccation of cords was reduced from 10 to 5 days, and again in 1935 to 4 days. " Is this a relation of cause and effect ? The future will show."

A report on rabies in Cuba is presented by Arenas Martorell and Herrada Llibre.[29] The number of human cases is not great, and shows a general decline from 10 in 1925 to 3 in 1933. During the period 1st September 1927 to 15th June 1931, 2,789 animals' brains were examined, of these 484 showed evidence of rabies. Measures of control by immunization of dogs, and by destroying stray animals are in force, and figures are given relating to the various districts.

v. *Rabies in Animals.*

An interesting report on the prevalence of Rabies in New York City, and on the methods of control is presented by Olesen.[30] The report is a long one and worthy of study ; only a few of its most interesting features can be mentioned here. A curve is given showing the number of rabid animals encountered in each year from 1908 to 1934. A period of high mortality (100–250) existed from 1911 to 1915, and a second (100–460) from 1926 to 1930. In the intervals, rabid animals were infrequent (50 and under). There appears to be no correlation between the number of rabid animals and the number of " animal bites," the numbers of the latter have increased more or less steadily throughout. The statistics of these " animal bites " are fully treated, but as these are not apparently related to rabbits they need not be considered here. The author concludes from his data that education of the public is as important as—if not more important than—regulation.

vi. *Post-Vaccinal Paralyses.*

When during the course of treatment or shortly after it, a person dies from a paralytic accident, and it is found that his brain causes a rabbit to die with the incubation of fixed virus rabies, there can be no

[28] Viala (Jules). Les vaccinations antirabiques à l'Institut Pasteur en 1934.—*Ann. Inst. Pasteur.* 1935. June. Vol. 54. No. 6. pp. 764–769.

[29] Arenas Martorell (Rogelio) & Herrada Llibre (Manuel). Estado actual de la rabia en Cuba.—*Rev. Parasit. Clin. y Lab.* Habana. 1935. Sept.–Oct. Vol. 1. No. 1. pp. 22–31. With 1 chart.

[30] Olesen (Robert). Control of Rabies in New York City.—*Public Health Rep.* 1935. Aug. 16. Vol. 50. No. 33. pp. 1087–1106. With 3 figs. [12 refs.]

doubt that the case is one of *rage de laboratoire*. When, however, a person dies with precisely the same symptoms as above, but the animal test fails, is this a case of *rage de laboratoire*? REMLINGER[31] quotes a number of cases of the first type treated by various methods in which living virus was employed. He points out that the number of cases of *rage de laboratoire* reported is much lower than the actual. In cases which have left the institute and returned home, the practitioner may be able to diagnose a Landry's paralysis, but he rarely proceeds to animal inoculation. Again the virulence may be low and the inoculated animal may escape. The symptoms of *rage de laboratoire* are those of acute myelitis, particularly of ascending type, and of bulbar paralysis. The author describes these in full. He also discusses the experimental diagnosis. Generally speaking the absence of Negri bodies in the horn of Ammon (though not in the oculo-motor nucleus) is indicative of fixed virus rabies, as also is the presence of Babes nodules. It is only exceptionally that there is any difficulty in differentiating post-mortem between street and fixed virus. The author concludes that in general the accidents of antirabic treatment, with the exception of some cases of paralysis after the use of dead vaccines, are largely due to fixed virus, even if they terminate in recovery, or if the result of the inoculation test is negative. This article should be read in full by those concerned with the treatment of rabies.

REMLINGER and BAILLY[32] have had occasion to examine a strain of fixed virus from an institute at which paralytic accidents have been observed. It was found to differ in many respects from the classic fixed virus. Comparison was made with the Tangier strain. The virus in question gave exclusively paralytic symptoms, incubated in 5 days in the rabbit, and death followed about the 8th day. In dogs symptoms were exclusively paralytic. No Negri bodies were found in the horn of Ammon nor in the oculomotor nucleus. In these respects the two strains were similar. But as regards desiccation, resistance to glycerine, and to ether considerable differences appeared. The virus under investigation remained invariably virulent up to 17 days, and lost virulence only about the 18th day of desiccation (as compared with about 1 day with the Tangier strain). It remained virulent after 44 days in glycerine (as compared with 8 to 10 days with the Tangier strain). It remained virulent in ether up to 280 hours, whilst the Tangier strain had lost virulence in 215 hours. The virus in question originally emanated from the Pasteur Institute in Paris. How had the change occurred? Whatever be the explanation, the necessity for periodical examination of the fixed virus strains employed at Pasteur Institutes is indicated.

vii. *Miscellaneous.*

A special number of the *Annales de l'Institut Pasteur*[33] commemorates the 50th anniversary of the first inoculation of man with an antirabic vaccine. The debt that humanity owes to Pasteur is recognized by all, and we would take this opportunity of offering our homage to the great master, who opened a new chapter in the evolution of medicine

[31] REMLINGER (P.). Le rage de laboratoire.—*Bull. Acad. Méd.* 1935. June 11. 99th Year. 3rd Ser. Vol. 113. No. 22. pp. 836–849. [Refs. in footnotes.]

[32] REMLINGER (P.) & BAILLY (J.). Virus rabique de passage à propriétés anormales.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 23. pp. 799–801.

[33] ANNALES DE L'INSTITUT PASTEUR. Supplément. Numéro commémoratif sur la rage. Publié le 25 octobre 1935.—228 pp. With numerous illustrations.

by his discoveries regarding immunity and immunization. The volume consists largely of a series of articles on subjects of immediate interest. The first on *rage de laboratoire* covers the same ground as the article by REMLINGER and already reviewed (see above). The second by LEVADITI and SCHOEN is a monograph in which their results regarding corneal inclusions in rabies are collected. In the third chapter MANOUÉLIAN gives a résumé of his views regarding the infectivity of the saliva. NICOLAU and KOPCIOWSKA recapitulate their observations on the reconversion of fixed virus into street virus. LÉPINE, CRUVEILHIER and SAUTTER discuss the properties of the Paris strain of fixed virus now in its 1,540th passage. GRYSEZ and MARNEFFE describe similarly the strain (*ex* Paris, 1895) in use at Lille. In a further article REMLINGER and BAILLY collect and discuss information regarding the alterations in the resistance of fixed virus strains to physical and chemical agencies, which occur during the course of sub-passage. PLANTUREUX gives a short paper on prophylactic vaccination of dogs. ROMENSKI describes an investigation in which he found that in experimental rabies the sodium content of the brain diminishes whilst the calcium increases. BOTEZ describes the method of heated vaccines combined with dried cords, employed at Cluj, and gives some statistics. During the years 1928–1932 of 15,958 persons treated 58 (0·36 per cent.) have died of rabies. The results of treatment at Marseilles are given by LIVON. CRUVEILHIER, NICOLAU and KOPCIOWSKA show that Pasteurian treatment increases the agglutinins against Eberth's bacillus, and increases the concentration of haemolysins generally. Finally HAGUENAU, CRUVEILHIER and NICOLAU discuss the effects of antirabic treatment upon other diseases. It has no effect on lumbago or vertebral rheumatism ; 9 cases of sympathetic pain were unaffected, as also were two of trigeminal neuralgia. On the other hand 6 out of 7 cases of sciatica were completely cured and 1 case of migraine seemed to respond.

The Pasteur Institute at Tunis[34] celebrated on the 6th of July, 1935, the 50th anniversary of the first application of antirabic treatment by Louis Pasteur. A message from NICOLLE was read.

An epileptic bitten by a dog was given a course of antirabic treatment by Hempt's method. His epileptic symptoms disappeared and he is now " cheerful, fresh, and able to work." NIKOLIĆ[35] was constrained to test his method of treatment in the case of other epileptics. It may be remembered that BARLA-SZABÓ (*Wien. Klin. Woch.* 1935, Vol. 48, p. 81) had used Högyes dilution method for cases of poliomyelitis. The point about Hempt's vaccine is that it contains no living virus. According to NIKOLIĆ it appears that the treatment of epilepsy with killed antirabic vaccines (such as Hempt's) can be used with hope of success in all forms of epilepsy except those which are traumatic or tuberculous. No evidence in favour of this conclusion is cited.

A Summary of Rabies in general is presented by GRAYSON and HASTINGS.[36] This is followed by a discussion in which much interesting light is thrown on the conditions under which it prevails in the Southern States of America. *A. G. McKendrick.*

[34] ARCHIVES DE L'INSTITUT PASTEUR DE TUNIS. 1935. June. Vol. 24. Nos. 3 & 4. pp. 527–528.—Cinquantième anniversaire de la vaccination antirabique.

[35] NIKOLIĆ (Milan). Behandlung der Epilepsie mit antirabischen Vakzinen.—*Muench. Med. Woch.* 1935. Sept. 13. Vol. 82. No. 37. pp. 1493–1494.

[36] GRAYSON (William B.) & HASTINGS (Gordon). The Problem of Rabies.—*Southern Med. Jl.* 1935. Oct. Vol. 28. No. 10. pp. 924–926. [11 refs.]

REVIEWS AND NOTICES.

LOEPER (Maurice) & collaborators. **Thérapeutique médicale. IX. Maladies infectieuses et parasitaires.** [Medical Treatment. IX. Infective and Parasitic Diseases.]—415 pp. 1935. Paris VIe: Masson et Cie, 120 Boulevard Saint-Germain. [50 fr.]

This work deals almost entirely with essentials and principles ; that is, it does not go too much into detail. Such would require a system of treatment in several volumes, part of which at least would soon be out of date. The present volume, therefore, has a more permanent value. It is divided into two main parts ; the first, which comprises two-fifths of the whole, deals with General Therapeutics and is the work of one man, Professor R. TURPIN, whereas the eleven chapters of part II, on Special Therapeutics, are contributed each by a separate author, a recognized specialist in his own domain.

In part I Professor TURPIN deals first with treatment by Vaccination. In this, as is natural, BCG receives more credit than it holds at present in British eyes. The author speaks of naturally and artificially attenuated viruses, the use of anatoxins, general technique and results of injection. In this and other chapters of the section, the historical introductions are of great interest. Chapter II deals with Serum Therapy, its applications, results and accidents. Bacteriotherapy follows—the principles of vaccine treatment by homologous and heterologous organisms. The chapter on Chemotherapy is too short. It is not possible to consider adequately in 23 pages the principles of chemotherapy, the various dyes, arsenicals, antimonials and mercurials, but so far as it can accomplish this the work is well up to date, and includes plasmoquine and even atebrin. The inequality in treatment of subjects is exemplified by the fact that the chapter on protein shock and protein therapy is given even more space than that on chemotherapy. The final chapter of this part is devoted to Haemotherapy.

Part II, Special Therapeutics, starts with a short chapter by Professor TANON on Disinfection in Infective Diseases. Surgeon-General DOPTER, whose name is well known to readers of this *Bulletin* and the *Bulletin of Hygiene* deals with the dysenteries ; the serum treatment of bacillary dysentery and its results, and vaccine treatment ; in amoebic dysentery, the uses, risks and results of emetine, of arsenicals in various forms—novarsenobenzol, stovarsol, treparsol, acetylarsan and sanluol—by yatren, etc., passing on to the modes of dealing with primary attacks, with relapses, and with the disease as it affects children. Ensuing chapters deal with tetanus, influenza, and the bismuth treatment of syphilis, by Drs. L. BAZY, R. Dujarric DE LA RIVIÈRE and Professor LEVADITI respectively. All give a good summary of present-day knowledge of their subjects.

Professor ABRAMI is entrusted with General Principles of the Treatment of Paludism—a short chapter of nine pages ; necessarily, therefore, a mere sketch—and he does not touch on prophylaxis. Anti-typhoid vaccination is adequately considered by Professor LEMIERRE, and Professor DEBRÉ gives a good general account of diphtheria, paying due homage to the work of RAMON, SCHMIDT, GLENNY and others whose names are household words in this regard. Vaccine and Serum Therapy of Virus Diseases is divided into three, *viz.*, rabies, poliomyelitis, and yellow fever. For some reason not readily understood more than half the space given to the second of these deals with Weil's

disease and *Sp. icterohaemorrhagiae.* The two final chapters, on the use of convalescent serum in the acute infective diseases, and the use of vitamins, especially vitamin A in infections, do not call for special comment ; both are still *sub judice.* *H. H. S.*

SHELLEY (Horace M.) [F.R.F.P.S., M.R.C.S., L.R.C.P., D.T.M. & H. (Eng.), Government Pathologist, Nyasaland, East Africa]. **An Epitome of the Laboratory Diagnosis and Treatment of Tropical Diseases.**—pp. xii+81. With 14 figs. Pocket-Monographs on Practical Medicine. 1936. London : John Bale, Sons & Danielsson, Ltd. 83–91 Great Titchfield Street, W.1. [2*s.* 6*d.*]

This is a good little book and will doubtless prove of service to the tropical practitioner who has only a small laboratory at his disposal. The character of laboratory referred to will be seen from the list of " articles and reagents required," given in section X of the book. An astonishing amount of useful methods and procedures and hints for carrying out laboratory examinations and indications for treatment is given, and all in four-score pages. The following remarks are made, not in any carping spirit, but as suggestions for a future edition, which is almost certain to be called for soon.

The equipment mentioned includes a haemoglobinometer ; it seems a pity therefore to give the Talquist method, and that only, for estimating haemoglobin, without any warning as to the large errors its use may entail. The easy method of estimating the colour index by use of the formula $\frac{H}{2E}$(H=Hb percentage, E the first two figures of the erythrocyte count) might be given. Unless the denominator 256 (p. 7) in estimating leucocytes is explained as the number of small squares counted, it seems a mere arbitrary figure.

Antisnake venom [meaning snake antivenine] is mentioned in treatment of the haemolysis of blackwater fever, but not the kind nor the dose and hence will not be very helpful to the worried practitioner. It is not the general experience to find the spirochaete of infective jaundice in the urine " during the first three or four days of the disease " ; it is rarely seen there before the tenth day. Under Yaws mention might be made of a ready method of obtaining fluid free from blood for examining for spirochaetes, *viz.*, touching the ulcer edge with a pledget of cotton wool dipped in alcohol, the serum will ooze up and often show an abundance of organisms. The diagnosis of melioidosis is not greatly facilitated by the statement that " the organism may be discovered in smears of the sputum " and " the patient's blood serum agglutinates an emulsion of the organism . . . " when nothing is said as to the characters, appearance or even name of the organism.

In the diagnosis of yellow fever we find the peculiar statement " albumin appears in the urine on the second day and increases in amount daily until it finally disappears." The last sentence is self-contradictory. Mention should be made of taking a blood sample of possible yellow fever patients after recovery and sending it to a laboratory for the protection test or in suspected fatal cases a portion of the liver for histological examination. In dengue or any other fever 5,000 leucocytes per cmm. would not be a " marked leucopenia," 1,500–2,000 would be nearer the number.

No indication is given that Oroya fever is merely the generalized form of verruga peruana and that the two are really different aspects of

the one disease. In sprue it is very unusual to find absence of free HCl from the gastric juice, especially if the histamine test be made, and in dealing with treatment something should have been said of Fairley's high protein, low fat, low carbohydrate régime which has met with such success. No means of diagnosing climatic bubo (Lymphogranuloma inguinale) is given, Frei's test receives no mention.

Periodide (p. 74) is one word; there are periodides of several alkaloids, and in this case merely implies the interaction of emetine and iodine in certain proportions, so that the final product contains 6 atoms of iodine.

Surely nobody unless he had money to waste would dream of preparing alcohol strengths from absolute alcohol. Absolute alcohol (or as near to absolute as is obtainable) costs about double the 90 per cent., and all dilutions needed can easily be made from this, accurately by Gay-Lussac's table or in round figures by the scale found in most laboratories.

Lastly, misprints are few: Schüffner (p. 2) has a modified u, and similar dots may be seen in quartan parasites in prolonged staining; Schaudinn (p. 34) has two n's, and 10 lines from the end of that page is a misprint; Sir Leonard Rogers is a host in himself and has a plural name. Ascaridole (not ascariodol) is the active principle of oil of chenopodium. In a future edition room might be found for the wrinkle of dipping stained blood slides in paraffin to preserve the colour for future examination, and for the general method of making up any solution of a desired strength from one of greater concentration without waste of material or the need for keeping several strengths. The page of diagrams of helminthic ova would be more serviceable if drawn to scale.

There is so much that is good in this book that the foregoing suggestions have been put forward for consideration of the author, who may see fit to adopt some of them in future editions. There is no question that the work was well worth the undertaking and that many tropical practitioners will be grateful to Dr. Shelley for it and to the publishers for producing the book in so handy a form at a price so absurdly low.

H. H. S.

Villain (Georges) [Médecin-Inspecteur de l'Hygiène Publique à la Direction Générale de l'Intérieur, à Tunis]. **Guide pratique d'examen microscopique du sang appliqué au diagnostic du paludisme. Suivi de : Technique, indications et résultats de la mélano-floculation par** A. F. X. Henry. [The Diagnosis of Malaria by Microscopical Examination of Blood.]—93 pp. With 5 figs., 1 chart & 7 coloured plates. [Supplément à la Biologie Médicale 1935.]

This Supplement to Biologie Médicale 1935 aims at providing the worker, who is deprived of the facilities of a modern medical Library, with a practical handbook to enable him to profit from use of his microscope, which is indispensable in the diagnosis of malaria. The final sections are devoted to indications for use of the Melano-Floculation test, its technique and interpretation.

Notes on the making and staining of thin and thick blood films are essentially practical, but are almost too brief in regard to the latter.

A general and differential description of the three chief malarial parasites with the associated blood changes is followed by corresponding notes on *Pl. ovale.*

Appreciation of the changes to be found in the blood cells is assisted by a section on normal and abnormal blood cells.

Note is made of other blood parasites which may be encountered, and some of the appearances which may simulate malarial parasites are explained.

A full page coloured plate is devoted to each of the four types of malarial parasites, and a fifth to thick film preparations. Two other plates illustrate blood cells and Leishmania and Spirochaetes which are met in N. Africa.

An evening's careful study of this handbook should enable a man, who knows how to use his microscope, but who is inexperienced in malaria, to prepare and stain a satisfactory blood film, and to form from it an opinion in regard to malaria. He will also be stimulated to search for further information on the interpretation of his findings from the larger text books which deal with protozoology and with malaria as a disease. *P. H. Martin.*

i. PAVLOVSKY (E. N.). **Textbook of Human Parasitology.**—592 pp. With 3 plates & 381 text-figs. 1934. Leningrad. (State Publishers of Biological and Medical Literature.) [In Russian.] [Roubles 9·20].

ii. PAVLOVSKY (E. N.) [Edited by] and Others. **Practical Course of Medical Parasitology.**—434 pp. With 230 text-figs. 1935. Leningrad. (State Publishers of Biological and Medical Literature.) [In Russian.] [Roubles 6·85].

The two books under review are based on many years of practical experience in teaching parasitology at the Military Medical Academy in Leningrad under the direction of Prof. Pavlovsky, who is one of the pioneers of Russian parasitology. The course is adapted to the needs of medical men and students and biologists in general, and deals mainly with the parasites and vectors encountered in the territory of the Soviet Union. An account is also given of the epidemiology of the various parasitic diseases, while the clinical and therapeutic aspects of these infections are omitted.

i. The theoretical course is divided into two sections, general and special. In the first a summary account is given of parasitism and the general problems of parasitology. The special section includes protozoology, helminthology and arachno-entomology, with special reference to the vectors of infection. The description of each parasite comprises its morphology, life cycle, sources of infection, bionomics, pathological effects and prophylaxis. In the case of fleas and mosquitoes (*Anopheles*) there are keys for the determination of genera and species respectively. Among the numerous illustrations many are original. In the part devoted to arachno-entomology, which is the author's speciality, the biology and ecology of insect vectors receives particular attention. This work is the only one of its kind in the Russian language and is of the high standard one usually associates with the author's name. The treatment of the subject throughout is authoritative and stimulating, so much so that one regrets that it is inaccessible to the foreign reader.

ii. The " Practical Course " is a companion-volume to the preceding book, and covers the same ground, with the addition of an appendix dealing with the poison-organs of various animals. The work is collective, the different sections being written by Prof. Pavlovsky and

a team of specialists. After a description of general laboratory technique, an account is given of the method of collecting, preserving and dissecting the parasites. The methods of dissection of insects, illustrated by original anatomical drawings, are of special value. In the case of mosquitoes and some other insects detailed instructions are given for conducting field observations on various stages of the insects. The practical text-book is thus a valuable guide to laboratory and field workers of different categories. *C. A. Hoare.*

Pavlovsky (E. N.) [Edited by]. **Materials on the Parasitology and Fauna of Southern Tadjikistan.—The Tadjik Complex Expedition of 1932 and the People's Commissariat for Health of the Tadjik S.S. Republic. Fasc. X. Reports of the Expedition.**—354 pp. 1935. Leningrad. (Published by the Academy of Sciences of U.S.S.R.) [In Russian.]

In 1932 the Academy of Sciences of U.S.S.R. organized a " Complex " Expedition to Tadjikistan (Middle Asia) with the object of making a comprehensive survey of all the natural resources of that country. It also included the study of the human inhabitants with special reference to public health. One of the expeditions, led by Prof. Pavlovsky of the Military Medical Academy, was charged with the parasitological and faunistic investigations, the results of which are recorded in this volume.

E. N. Pavlovsky (" On *Ornithodorus* inhabiting burrows in Tadjikistan, and their relation to the spread of relapsing fever," p. 19) demonstrated that *Ornithodorus* in all stages of development were widely distributed in the burrows of tortoises, hedgehogs, rodents and other animals, upon which they fed. It was found that under experimental conditions these ticks do not transmit spirochaetes to guinea-pigs. However, *O. papillipes* found in caves in the Caucasus have been known to infect human beings with relapsing fever. The author was also able to demonstrate that the spirochaetes remained viable and virulent in ticks kept in laboratory conditions without food for 4½ years. These facts show that this species (and possibly others) even when found in abandoned dwellings or in natural biotopes are capable of retaining the virus almost indefinitely, thus constituting a potential source of infection. In a paper " On the effect of the bite of *Ornithodorus* and *Argas* upon the human skin " by E. N. Pavlovsky and A. K. Stein (p. 45), a differential diagnosis is given of the dermatological picture obtained in the case of each of the two genera. The paper is illustrated by a coloured plate depicting the various types of papules.

A. Hostyša (p. 55) deals with the pathology of the comatose form of malaria, based on 42 cases. V. G. Fedorov (p. 85) writes " On the fauna of blood-sucking mosquitoes of the town Stalinabad," while *P.* Perfiliev (p. 94) gives a morphological and systematic description of " The sandfly fauna of Middle Asia," together with a key for the identification of females and males respectively. It is pointed out that *Phlebotomus barowskii* Chodukin, 1931, probably represents *P. sergenti* var. *mongolensis*. The incidence and ecology of ticks are dealt with by M. Pospelova-Strom in the following papers : " On the ticks of wild animals of the Tadjik S.S. Republic " (p. 113) and " Contributions to the knowledge of the ticks of domestic animals in Tadjikistan " (p. 135). V. G. Fedorov (p. 149) provides a list of ectoparasitic arthropods from dogs of Stalinabad. E. N. Pavlovsky and A. Gižyckij (p. 155) devote

a paper to " Human beings bitten by the karakurt in the Baumanabad district of Tadjik S.S.R." in which 9 cases are described. The characteristic symptoms of the bite of *Latrodectes tredecimguttatus* are as follows : cyanosis of the face, neck and upper half of the body ; oedema of the eye-lids, dilatation of the pupils, dryness of the tongue, slow and irregular pulse, muffled heart sounds, limitation of excursions of the lung, respiratory irregularities, copious perspiration, constipation and retention of urine, muscular tremors and the appearance of albumen in the urine. All these symptoms usually disappear by the fifth day. The site of the bite is represented by a pinkish spot with two red points in the middle.

E. N. PAVLOVSKY (p. 169) further records some " Observations on the ' domestic inhabitants ' and poisonous animals in Tadjikistan," treating man and the various animals sharing his dwelling as a biotic community, with special reference to their epidemiological rôle.

G. G. SMIRNOV (p. 203) provides " Materials for the helminthic fauna of the aboriginal and immigrant population of Tadjikistan " : the incidence of worms in the latter category (17·2 per cent.) proved to be twice as high as in the former (8 per cent.). In a paper " Sur la faune des trématodes de Tadjikistan " (p. 219) I. SHTROM (= Strom) gives a description of the trematodes found in various classes of vertebrates. These include two new species ; *Lyperosomum gorbunovi* sp. n. from *Cotyle riparia* (Aves) and *Lecithodendrium rotundum* sp. n. from a bat, *Rhinolophus hipposideros*, the description of which is given in a French summary. The remaining four papers are concerned with the non-parasitic fauna and with the water-supply of the villages.

C. A. Hoare.

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